Symphony Plus

S+ Operations 1.1.0
P13 Connectivity Guide

Symphony Plus

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ABB

Symphony Plus

S+ Operations 1.1.0

P13 Connectivity Guide

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1. INTRODUCTION

"Symphony Plus Operations" is the human system interface (HSI) to various ABB distributed control systems. The "**S+ Operations P13 Connect**" provides the connectivity between the ABB HSI and the Procontrol P13 distributed control system. Multiple connectivity's to Symphony Plus Operations exist within ABB.

This document describes the steps required to configure and operate the Procontrol P13 specific functions of S+ Operations. For an overview of the main components included in this product, see Figure 1-1.

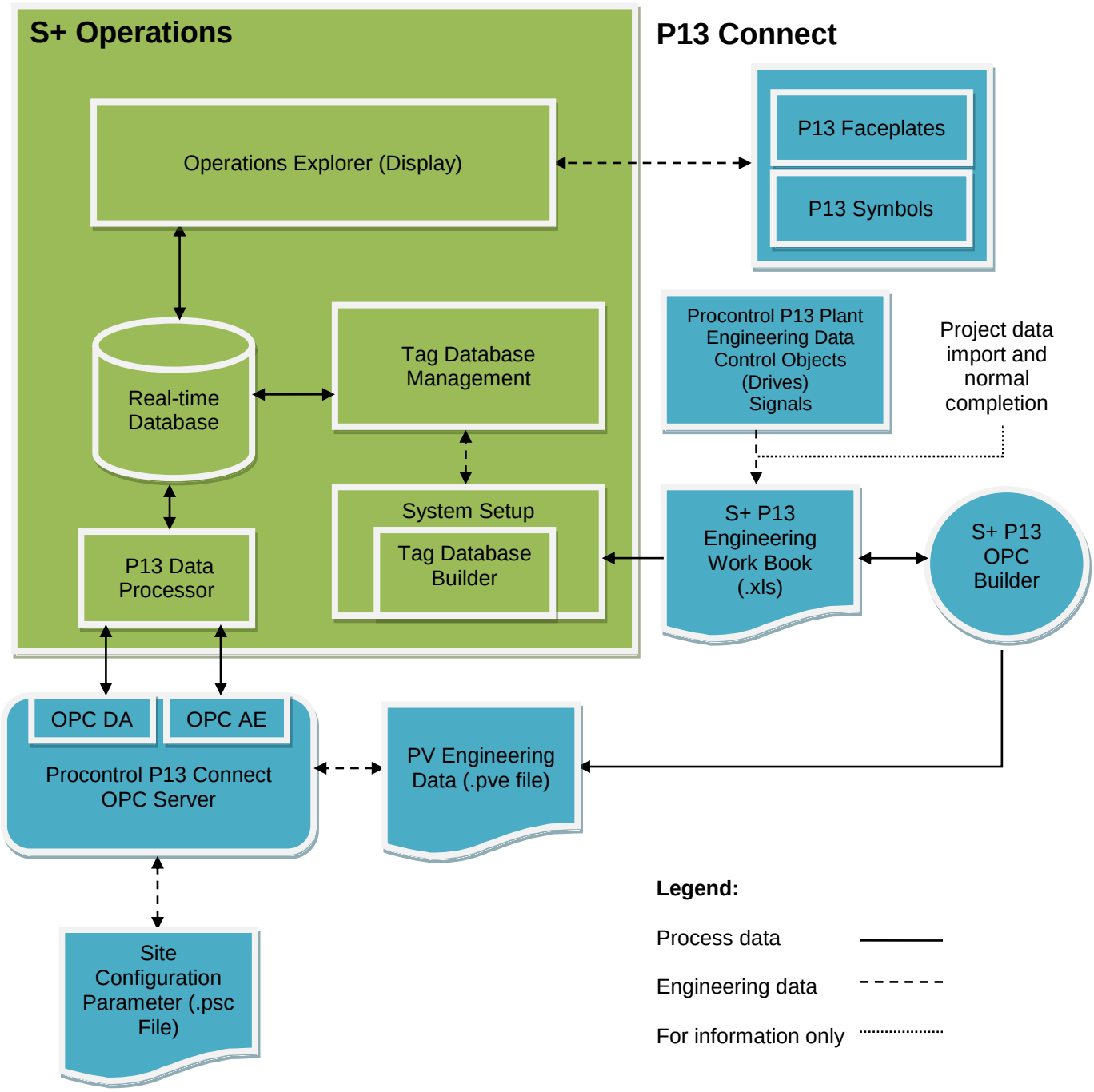

Figure 1-1: S+ Operations - P13 Connect Overview

1.1 Terms

Table 1-1: Terms

Term	Definition
S+ Operations	ABB's operator station or human system interface (HSI)
S+ Operations P13 Connect	ABB's connectivity product between "Symphony Plus Operations" and the Procontrol P13 distributed control system
S+ Operations Server	S+ Operations server is the host for the P13 OPC Server
Control Object	Process Objects representing control functions with associated commands and feedback signals
Error	Error in feedback signal
Channel Failure (CF)	Communication Failure between P13 OPC Server and Symphony Plus Server
Process Object	Named object representing a Process Signal or a Control Object
Process Signal	Process Object representing an analog (AI, AO) or binary (DI, DO) value
PServer	Procontrol P13 Connect OPC Server
P13	Designates the Procontrol P13 distributed control system
ID-Signal	Signals sent by the P13 OPC server to Procontrol as part of a command. ID-Signals are not used in Symphony Plus
Process Variable	Named object representing a Process Signal or a Control Object
Tag	Synonym for Process Variable
BK06	P13 device providing communication to P13 local station via a communication network
PIF	P13 process bus Interface module between an intraplant bus and the S+ Operations Server
PRAUT80.13P	Previous Procontrol HSI based on proprietary hardware used as local HSI
VPC	Video Process Control comprises all the functionality directly related to process operation through the graphical user interface. This includes the handling of commands towards control objects and the handling and presentation of feedback information from control objects.

1.2 Abbreviations

Table 1-2: Abbreviations

Abbreviation	Definition
HSI	Human System Interface (operator station)
IPB	Intraplant Bus of Procontrol P13/42 system
LB	Local Bus of Procontrol P13/42 system
OPC	OLE for process control. OPC is designed to deliver open connectivity via open standards in industrial automation and is based on a series of standards specifications from the OPC Foundation
OPC AE	OPC specifications for alarms and events
OPC DA	OPC specifications for data access
S+	Symphony Plus
PServer	Procontrol P13 Connect OPC Server
PV	Process Variable
S+ Operations	Symphony Plus Operations - HSI
COM	Microsoft's Common Object Model
PIF	Process Bus Interface
VPC	Video Process Control

2. INSTALLATION

2.1 Software and Hardware Requirements

For Procontrol P13 Connect OPC Server
Below SW / HW specifications are the basic requirements for optimum operation
Hardware:

PC - Pentium Core DUO	1.3 GHz CPU, minimum 1 GB RAM
Serial ports:	1 port per BK06 coupler
ISA slots:	1 full length ISA slot per PIF coupler
PCI slots:	1 PCI slot per PIF03 coupler
HD memory partition:	64 MB

Software:

Operating system version:	Windows 7, Windows 2008

2.2 Software Installation

The Symphony Plus software is delivered on an installation DVD. To install the product, start Setup.exe from the installation DVD and follow the instructions of the install shield wizard.

When the Symphony Plus installation DVD is inserted into the drive, the installation AUTORUN screen will appear. If it does not, navigate to the root directory of the DVD and manually launch Setup.exe. This screen allows direct access to the various software installation programs of Symphony Plus. Refer to "**2VAA000714-100_SPlus_System_Installer_InstallationManual" for** different component installations.

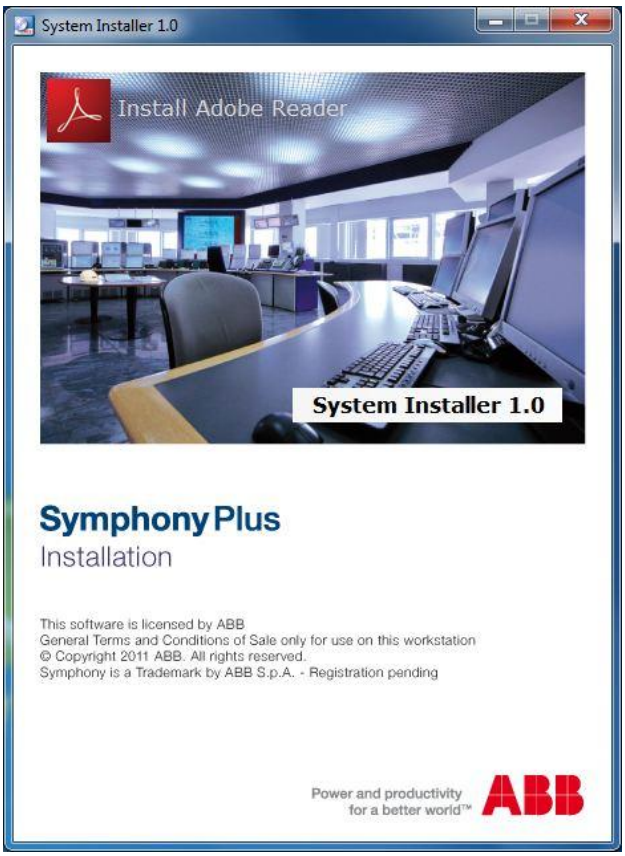
System Installer 1.0
Install Adobe Reader
System Installer 1.0
Symphony Plus
Installation
This software is licensed by ABB
General Terms and Conditions of Sale only for use on this workstation
© Copyright 2011 ABB. All rights reserved.
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Figure 2-1: Symphony Plus Installation Screen

2.3 S+ Operations P13 Connect Installation

After installation the different components of the server (Third Party, S+ Operations & S+ Historian), S+ System Installer the installation of S+ Operations - P13 Connect will start.

.

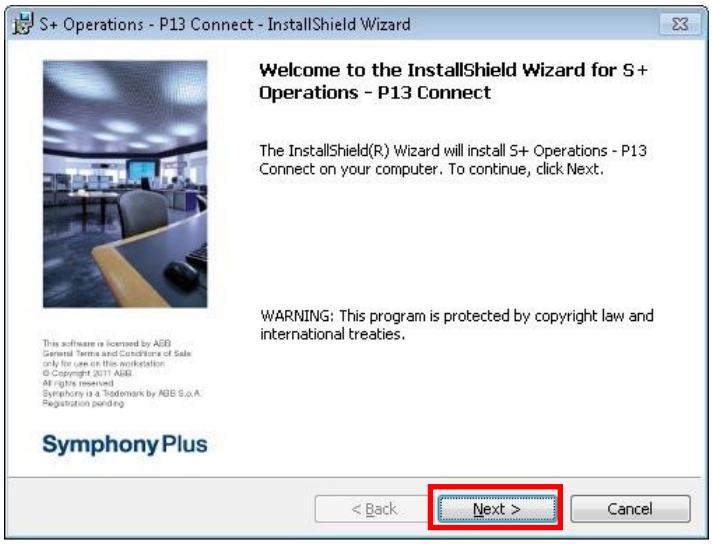

S+ Operations - P13 Connect - InstallShield Wizard
Welcome to the InstallShield Wizard for S+ Operations - P13 Connect
The InstallShield(R) Wizard will install S+ Operations - P13 Connect on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
Symphony Plus
< Back
Next >
Cancel

Figure 2-2: S+ Operations P13 Connect Installation – Step 1

Step 1: Click “Next” to continue the installation

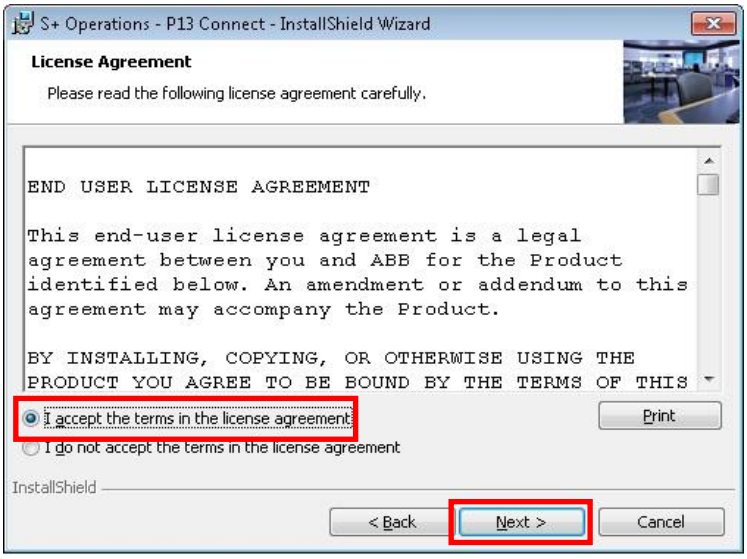

S+ Operations - P13 Connect - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
END USER LICENSE AGREEMENT
This end-user license agreement is a legal agreement between you and ABB for the Product identified below. An amendment or addendum to this agreement may accompany the Product.
BY INSTALLING, COPYING, OR OTHERWISE USING THE PRODUCT YOU AGREE TO BE BOUND BY THE TERMS OF THIS
I accept the terms in the license agreement
I do not accept the terms in the license agreement
Print
InstallShield
< Back
Next >
Cancel

Figure 2-3: S+ Operations P13 Connect Installation – Step 2

Step 2: Select options as shown in the Figure 2-3.

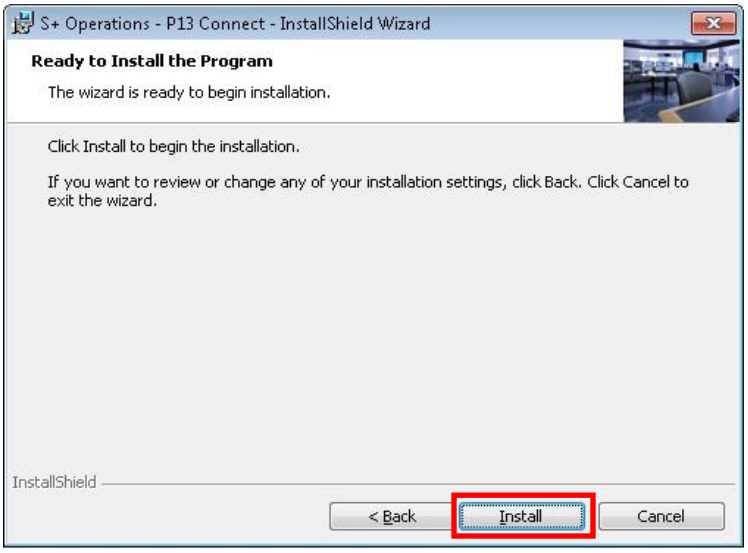

S+ Operations - P13 Connect - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Figure 2-4: S+ Operations P13 Connect Installation – Step 3

Step 3: Click “Install” to continue the installation.

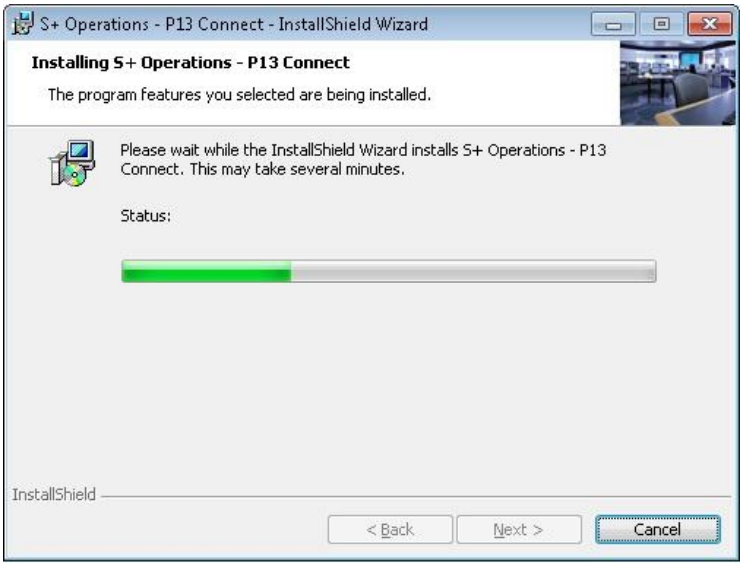

S+ Operations - P13 Connect - InstallShield Wizard
Installing S+ Operations - P13 Connect
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs S+ Operations - P13 Connect. This may take several minutes.
Status:
InstallShield
< Back
Next >
Cancel

Figure 2-5: S+ Operations P13 Connect Installation – Step 4

Step 4: This step completes the installation of S+ P13 Engineering Workbook, S+ P13 OPC Builder and the required dll file.

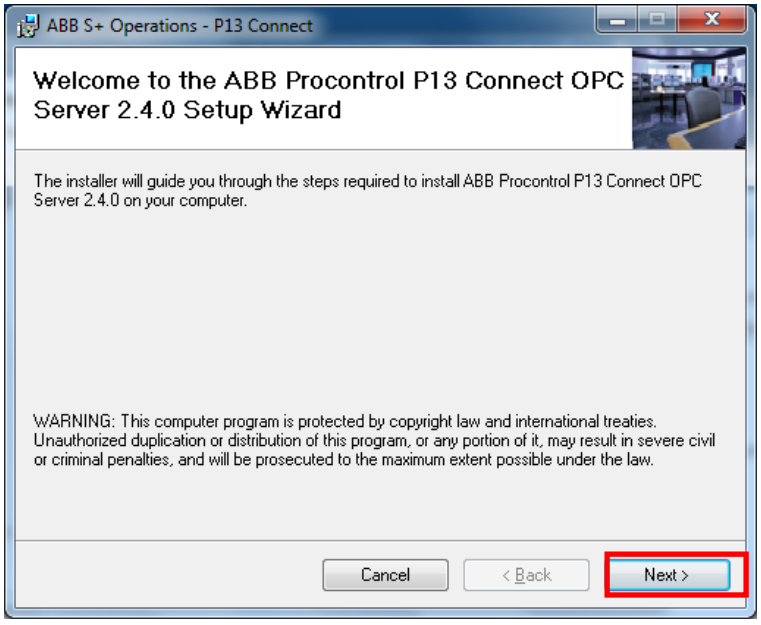


ABB S+ Operations - P13 Connect
Welcome to the ABB Procontrol P13 Connect OPC Server 2.4.0 Setup Wizard
The installer will guide you through the steps required to install ABB Procontrol P13 Connect OPC Server 2.4.0 on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

Figure 2-6: S+ Operations P13 Connect Installation – Step 5

Step5: This step starts the installation of the Procontrol P13 Connect OPC Server. Continue the installation by clicking “Next”.

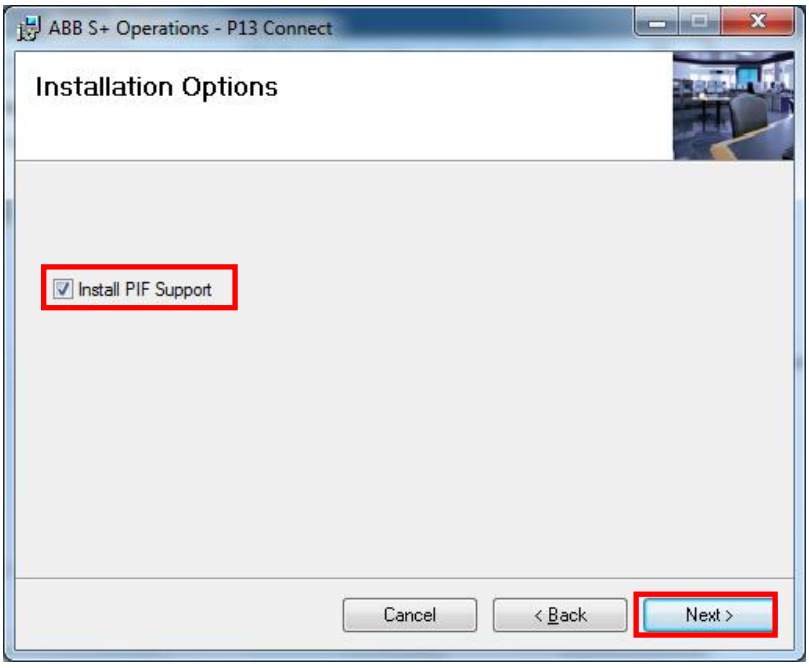


Figure 2-7: S+ Operations P13 Connect Installation – Step 6

Step 6: Based on the specific plant requirements check if needed the “Install PIF Support” option and select “Next”. By default “Install PIF Support” is checked.

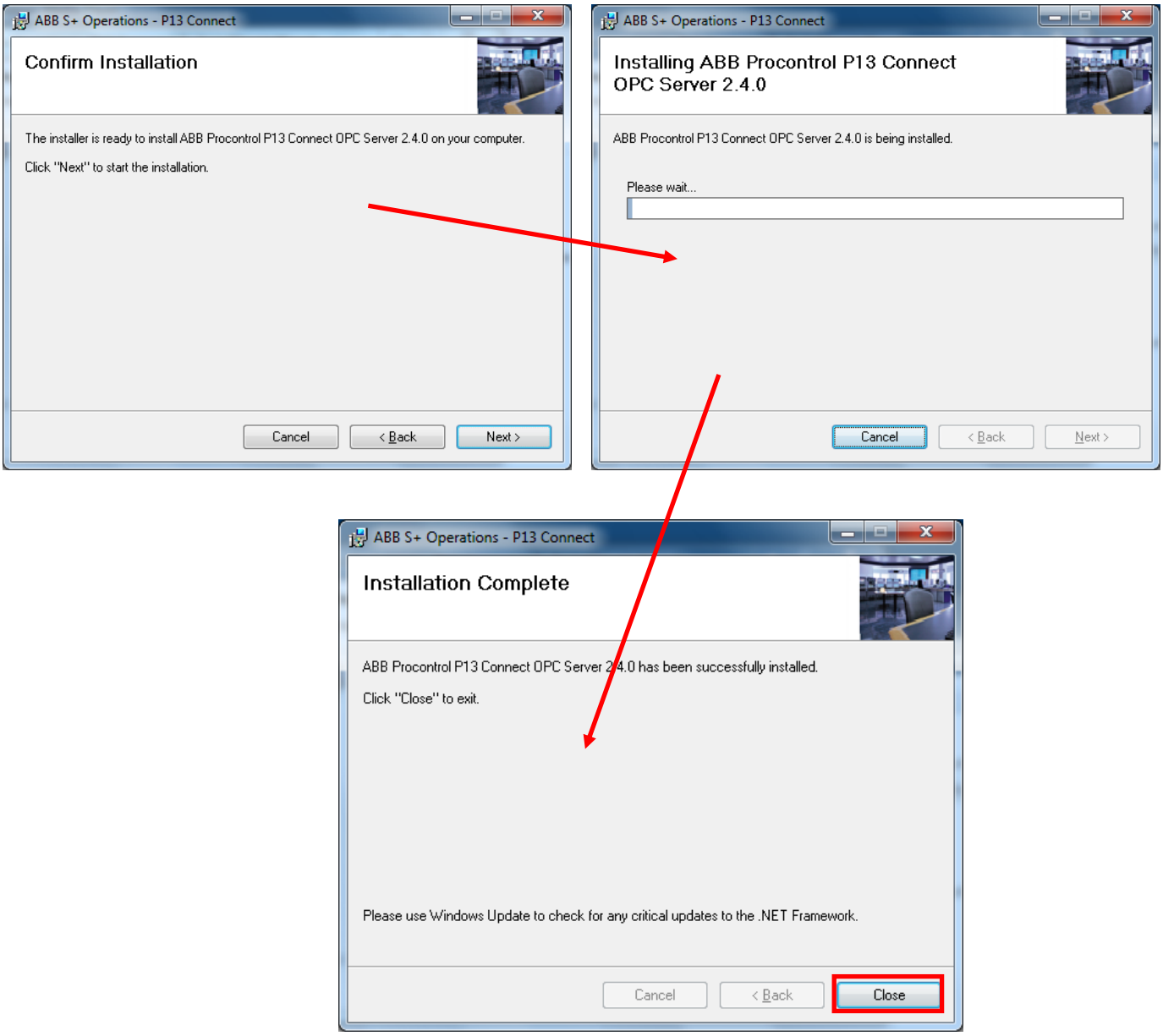


ABB S+ Operations - P13 Connect
Confirm Installation
The installer is ready to install ABB Procontrol P13 Connect OPC Server 2.4.0 on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >
ABB S+ Operations - P13 Connect
Installing ABB Procontrol P13 Connect OPC Server 2.4.0
ABB Procontrol P13 Connect OPC Server 2.4.0 is being installed.
Please wait...
Cancel
< Back
Next >
ABB S+ Operations - P13 Connect
Installation Complete
ABB Procontrol P13 Connect OPC Server 2.4.0 has been successfully installed.
Click "Close" to exit.
Please use Windows Update to check for any critical updates to the .NET Framework.
Cancel
< Back
Close

Figure 2-8: S+ Operations P13 Connect Installation – Step 7

Step 7: Complete Procontrol P13 OPC Server installation as shown in Figure 2-8: S+ Operations P13 Connect Installation – Step

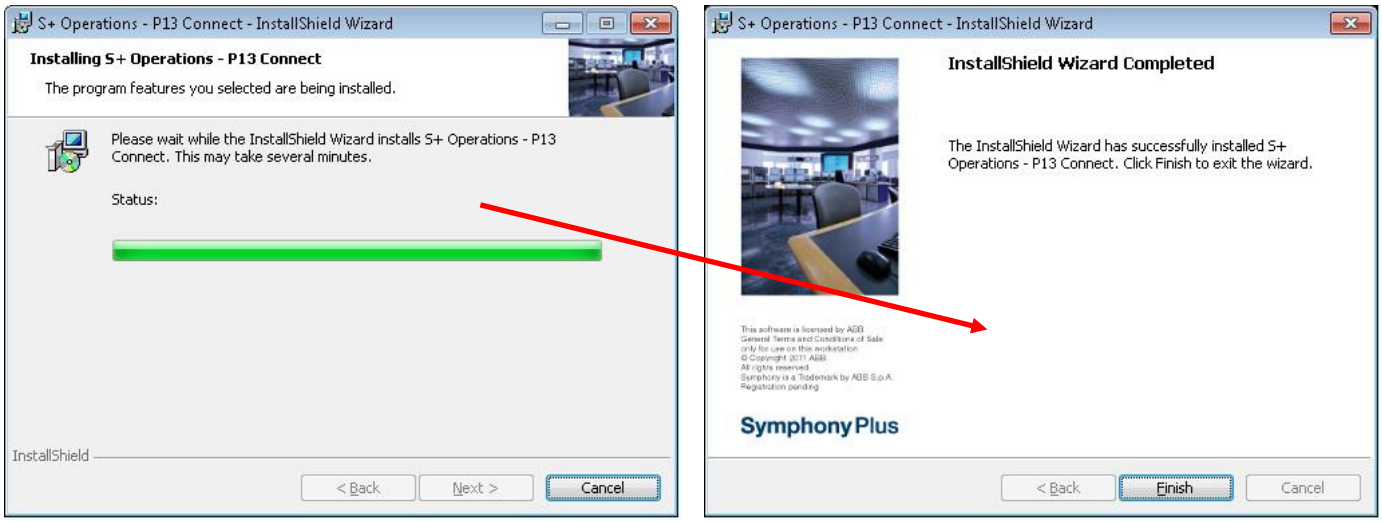

S+ Operations - P13 Connect - InstallShield Wizard
Installing S+ Operations - P13 Connect
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs S+ Operations - P13 Connect. This may take several minutes.
Status:
InstallShield
< Back
Next >
Cancel
S+ Operations - P13 Connect - InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed S+ Operations - P13 Connect. Click Finish to exit the wizard.
Symphony Plus
< Back
Finish
Cancel

Figure 2-9: S+ Operations P13 Connect Installation – Step 8

Step 9: Complete S+ Operations - P13 Connect installation as shown in **Figure 2-9: S+ Operations P13 Connect Installation – Step 8**

Figure 2-9: S+ Operations P13 Connect Installation –

After the installation of S+ Operations - P13 Connect, S+ System Installer installs S+ Operations Display Library which consists of required faceplates, P13 data processor, fonts and necessary registry settings.

3. PROCONTROL P13 OPC SERVER

3.1 Product Overview

PServer is an OPC Server for Procontrol P13/42. It supports the OPC standards for Data Access 2.0 and Alarm & Event 1.0. Via the PServer, client applications can access data in a Procontrol system. The PServer supports communication with Procontrol via serial line and bus coupler BK06 or via PIF board and intraplant bus P42.

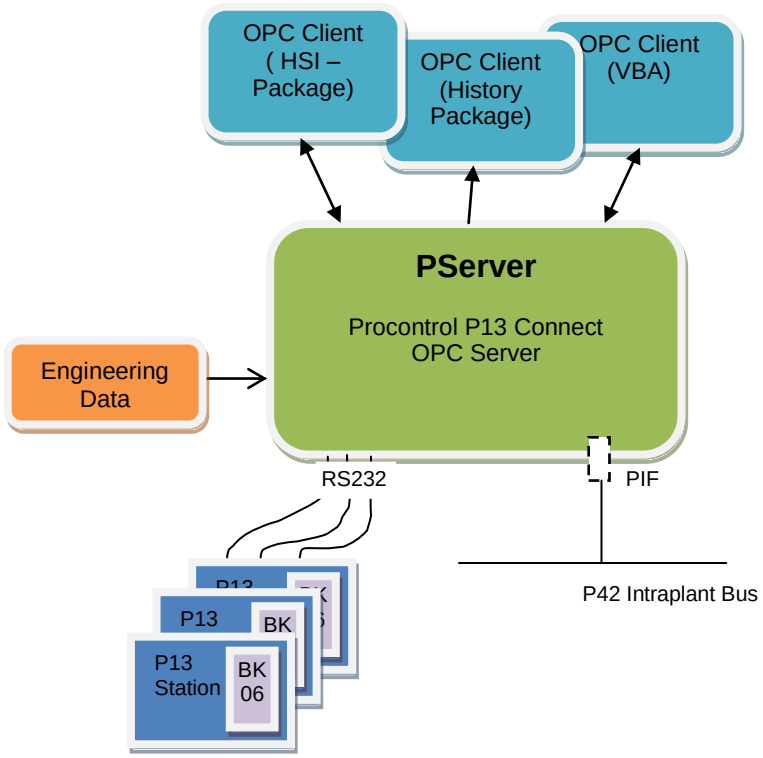


Figure 3-1: PServer

PServer allows to access Procontrol data from two different viewpoints:

- Control system data access
- Data items representing “raw” Procontrol data words are provided.
- Process image data access
- Data items representing “Process variables” as DI, AI, DO, AO are provided. For commands towards Procontrol multifunction, corresponding command items are provided. These command items allow a logical access to commands independent of the particular signals sent. PServer was developed as a “stand-alone” server and can be used by several client applications simultaneously or via the network.
- PServer runs on the Windows NT PC Platform.

3.2 OPC Server Post Installation

3.2.1 Equipment Configuration

3.2.1.1 BK06

Required BK06 Firmware: HESG 492 119 or HESG 492 128C
The parameters for the serial interface of BK06 are defined by respective EPROM programming. PServer uses parameter settings as listed in the following table.

Table 3-1: Serial port settings for BK06

Parameter	Value
Data bits	8
Stop bits	Configurable

Parity	Configurable
Flow control	None
Baud rate	Configurable

For details of BK06 programming see *BK06Programming*.

3.2.1.2 PIF

The settings on the PIF hardware listed in the following table must match the corresponding PIF configuration parameters in PServer.

Table 3-2: PIF Settings

Parameter	Value
I/O channel (Address range)	Select a free channel
Station Address	According to plant configuration
Interrupt level	Select a free level (Or disable interrupt in PServer)

For details of PIF hardware configuration see *PIF Users Guide 1KHZ 102 655*.

3.2.2 OPC Server Service Configuration

A good practice for the OPC Server service configuration is, to use the same account for the OPC Server as used for the S+ Operations, e.g. *SPLUS.* In order to create the Service, execute the OPC Server via Start Menu ->ABB P13 Connect OPC Server-> *PServer – Create Service*

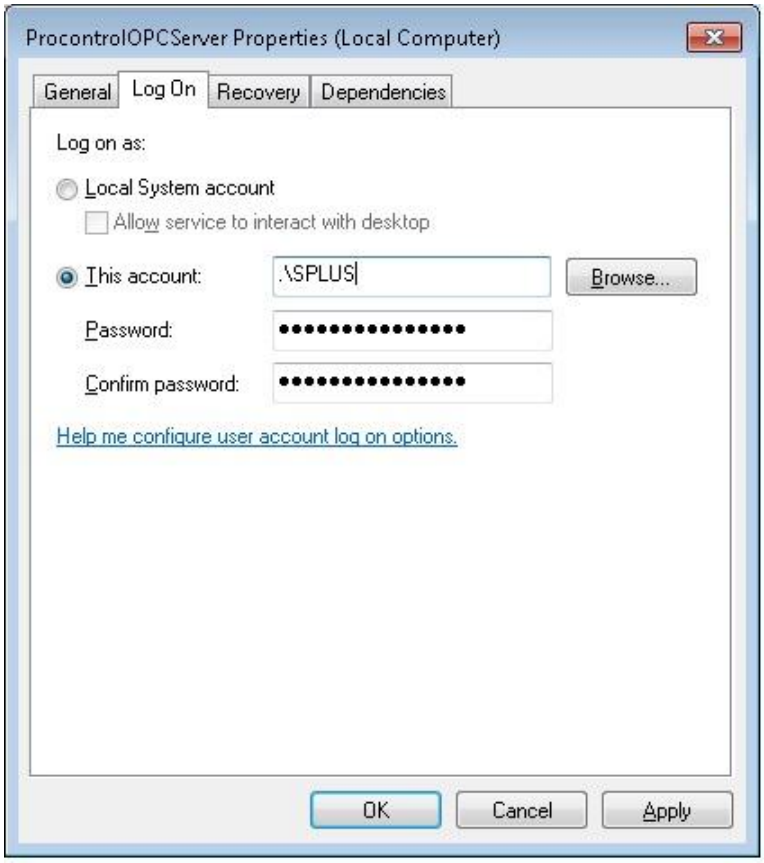


Figure 3-2: Configure Procontrol OPC Server Service for Redundant Servers in a Workgroup

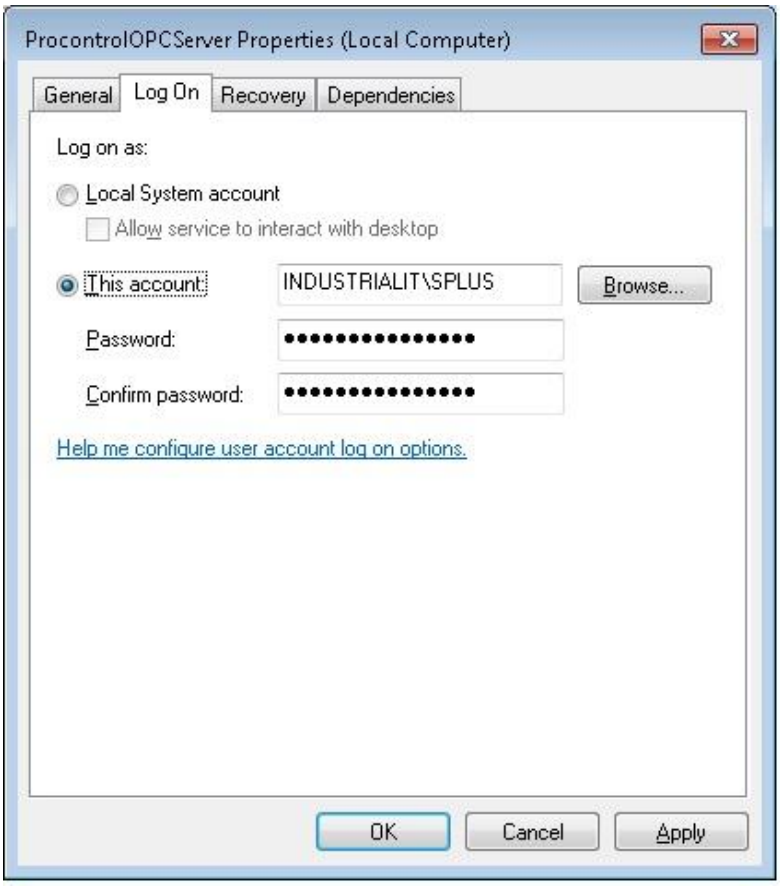


Figure 3-3: Configure Procontrol OPC Server Service for Redundant Servers in a Domain

Remark:
Do enter the account in the form <Domain Name>\<User name> (e.g. INDUSTRIALIT\SPLUS), do not enter the account in the form provided by Browse...!

To ensure, that the OPC Server will be started under the selected service account with the desired configuration file (psc-file), login once with this account, start the OPC Server via Start Menu ->...-> *PServer Configuration*, open the desired configuration file and exit again.

3.2.3 Start-up and Product Verification

By means of the OPC test clients included and the sample configuration provided, the installation can be verified by the procedure as described here. After entering the site configuration and connecting the corresponding coupling hardware (BK06, PIF) an appropriate test concerning this configuration must be performed. This test procedure assumes that the data access client and the event client have been installed.

1. Start Data Access Client and connect it to the ABB Procontrol OPC Server
   Select: Start-> Program Files -> ABB P13 Connect OPC Server ->Data Access Client. In the data access client select: *OPC->Connect.* This will bring up the *Select OPC Server* dialog. In the list of available servers, the ABB Procontrol Server must appear. Select this and leave with OK.

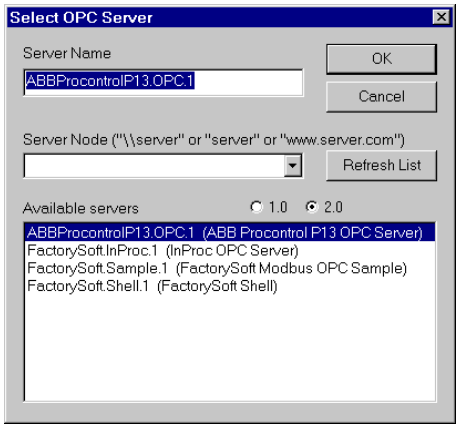


Figure 3-4: Dialog to select OPC Server in data access client

This starts the PServer, if not already started. The PServer window can be opened through the Windows taskbar. The Help->About dialog shows the product version.

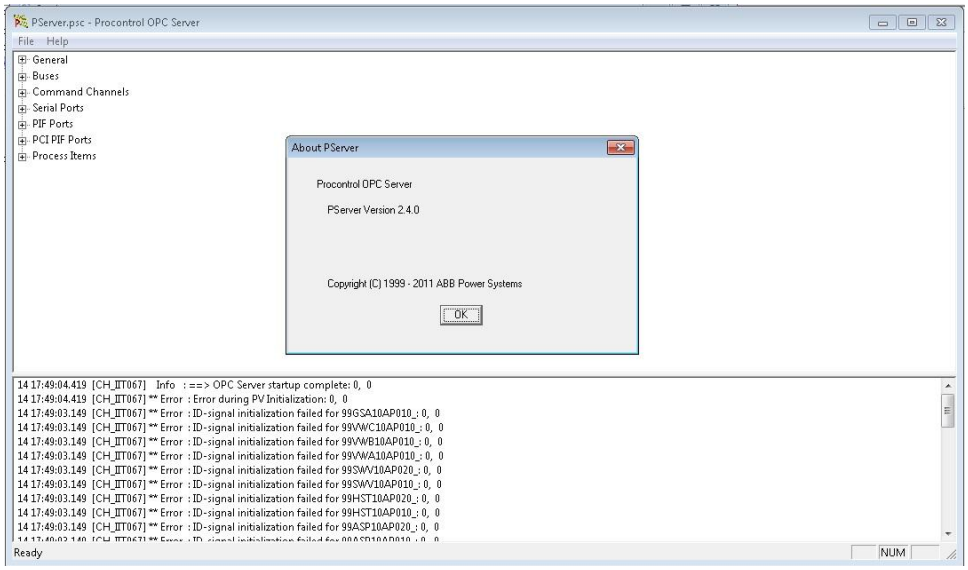


Figure 3-5: PServer window after initial installation[1]

1. Start Event Client
   Select: Start -> Program Files -> ABB P13 Connect OPC Server -> *Event Display Client*
   The event client is started and automatically connected to the Procontrol OPC Server.
2. View and modify data in Data Access Client – Check messages in Event Client
   *OPC -> Add Item…*brings up the following browser dialog.

[1] The PServer Window can only be seen if PServer is started in configuration mode!

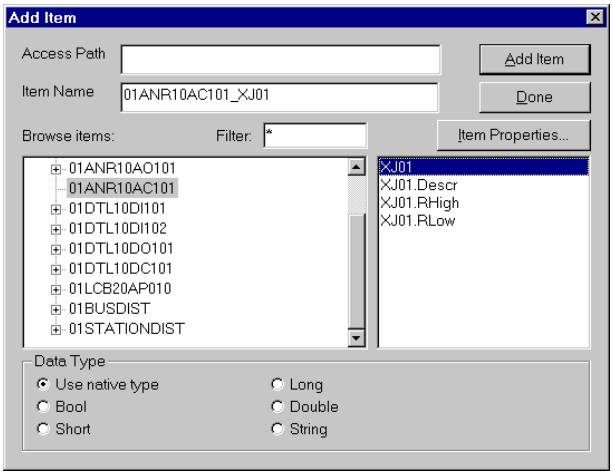


Figure 3-6: Browser dialog for sample configuration

Add the calculated variables *01ANR10AC101_XJ0J* (Analog) and *01DTL10DC101_XS01* (Digital) to the group. Write a value to both variables and check the display.

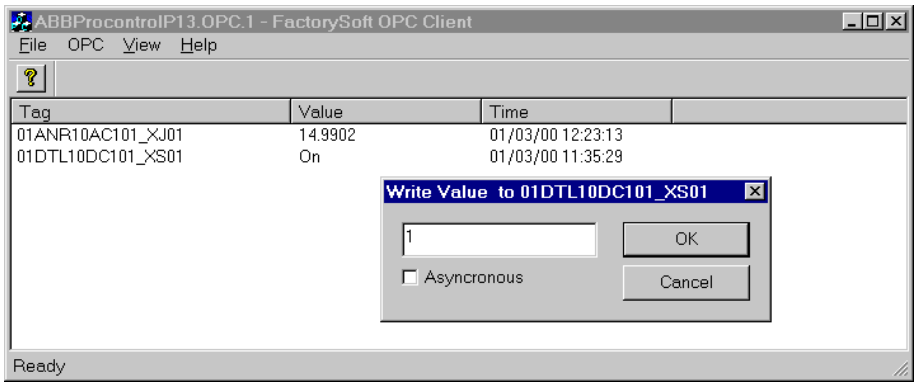


Figure 3-7: Writing values to calculated test variables

Writing to the digital value will cause messages in the event client as shown in the following figure.

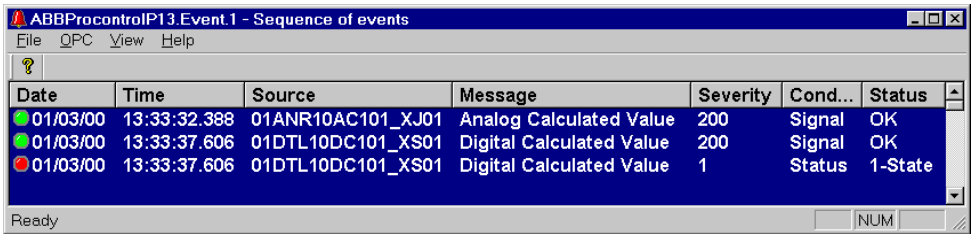


Figure 3-8: Messages generated by writing to calculated test variables

3.2.4 Licensing

After the installation of the PServer software, you will have an evaluation license which always expires after 15 days. After this time the PServer will automatically terminate. During this time you have to acquire a registered license code from ABB Power Automation AG, Switzerland.

For the registration, perform the following steps:

- Start the Licence tool (Procontrol OPC Server -> Pserver - Licence)
- Select Licence->Register.
- Copy the Reference Code from the licence dialog :

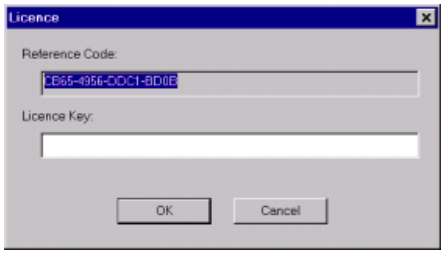


Figure 3-9: Reference code – License Dialog

Send an E-Mail with your reference code and the product serial number to the following address: PlantControl.support@ch.abb.com

- After receiving the license key, you can finish the registration.
- Verify that the software is properly registered: (*Licence->Licence status*.)

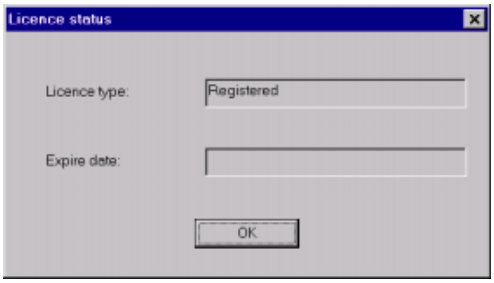


Figure 3-10: Software Registered – License Dialog

3.3 Configuration and Engineering

3.3.1 Overview

The project-specific application data used by PServer can be classified as follows:

- Site Configuration Parameters (.psc)
  These parameters comprise the basic parameters concerning bus connections, VPC interfaces etc. They can be modified through the PServer configuration user interface.
- Process Variable Engineering Data (.pve)
  These data comprise all parameters defining the process variables and control objects to be created for the application.

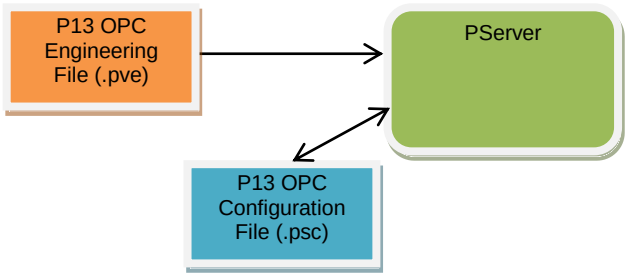


Figure 3-11: Project-specific application data for PServer

3.3.2 Site Configuration Parameters

3.3.2.1 General

The Site Configuration Parameters determine the PServer-related site-specific properties of the Procontrol P13 control system. The following parameters need to be configured,

- VPC concept
- Number and types of connected buses
- Properties of used serial ports for BK06 connection
- Properties of used I/O ports for PIF/PCI-PIF connection

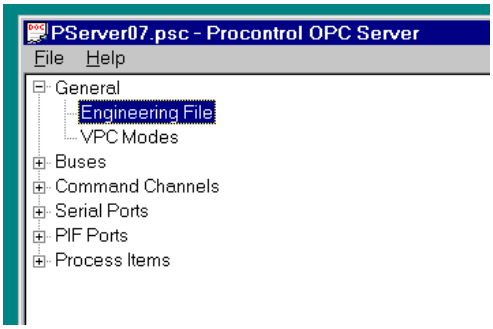


Figure 3-12: Menu Tree for Site Parameter Configuration

Site configuration parameters are stored in a PServer site configuration file (.psc). On start-up, PServer loads the site configuration file according to the recent file list, i.e. the file last accessed and existing is loaded.

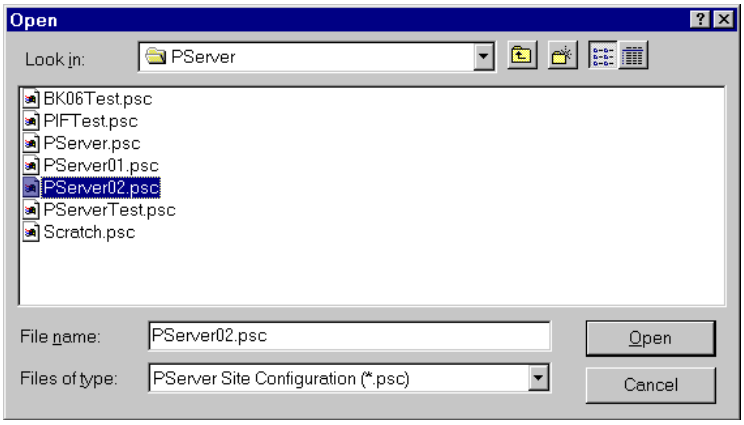


Figure 3-13: Open Dialog for PServer Site Configuration File

The default file extension for PServer site configuration files is *.psc*.

Important
To activate modifications of site parameters, save the configuration file, exit the PServer configuration and then restart it!
The option to handle PServer site configuration files is provided as an option in menu *File.*

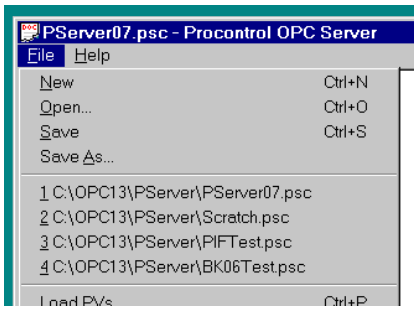


Figure 3-14: Menu items to handle PServer site configuration files

3.3.2.2 Process Variable Engineering File Configuration

The PServer receives the process variable engineering data via the process variable engineering file. This file is normally loaded by the PServer at start-up. The pathname of the file to be used by the PServer can be configured as site configuration parameter. Additionally the automatic loading at start-up can be deactivated. This can be useful during testing and commissioning. Manual loading can be achieved by the menu command File->LoadPVs.

The property page Engineering Files allows also to configure the Server ID, which is an identification number for the server. This number can be used in conjunction with the SERVER parameter set (see 3.3.3.4.5 SERVER Instruction) to load only a subset of the object defined in the process variable engineering file. This simplifies engineering data handling in systems with redundant HMI-servers in that the same engineering data can be used for both of the redundant servers.

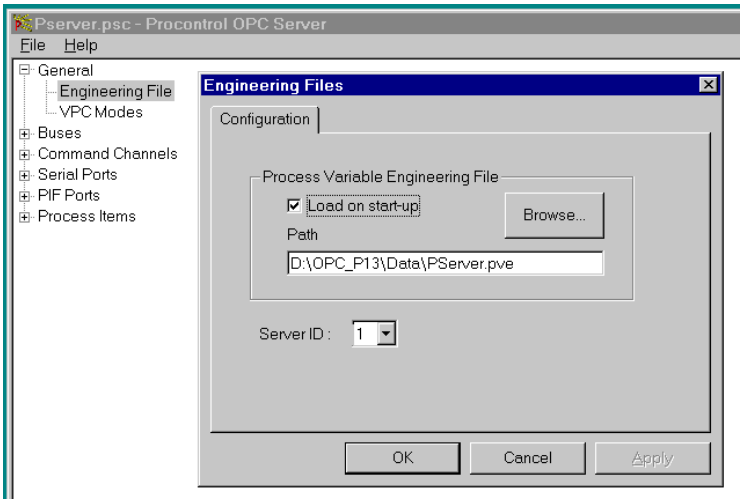


Figure 3-15: Property Page for PV Engineering File Configuration

3.3.2.3 VPC Modes Configuration

PServer supports a “logical” interface for VPC commands. This means, that a client can issue commands via a corresponding command item which hides the specific signal concept (“VPC mode”) implemented for a certain plant.

The VPC mode to be used can be selected on the corresponding VPC mode property sheet. It should be kept in mind, that the PV engineering data to be supplied is also dependant from the VPC mode. The other two modes are options for special applications.

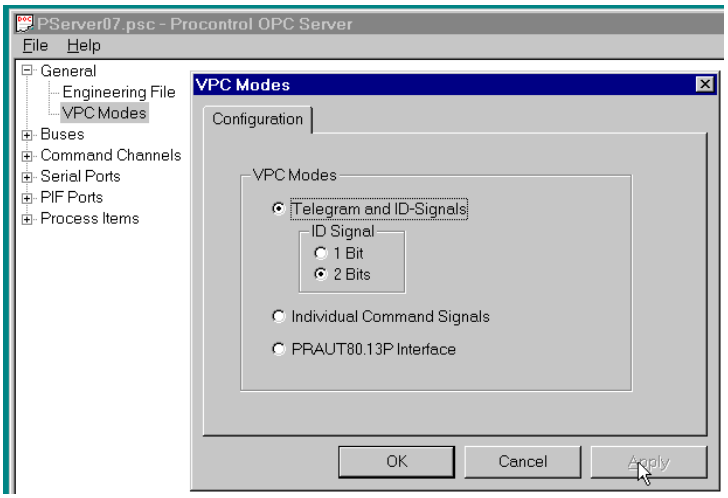


Figure 3-16: Property Page for VPC Mode Configuration

3.3.2.4 Bus Configuration

The bus configuration determines which bus connections the PServer is using. A bus connection can be either a connection to a local station via BK06 or to an intraplant bus via PIF board. To a bus connection, a port of a corresponding type must be associated. A BK06 coupling must be associated to a serial port, a PIF connection must be associated to a PIF port.

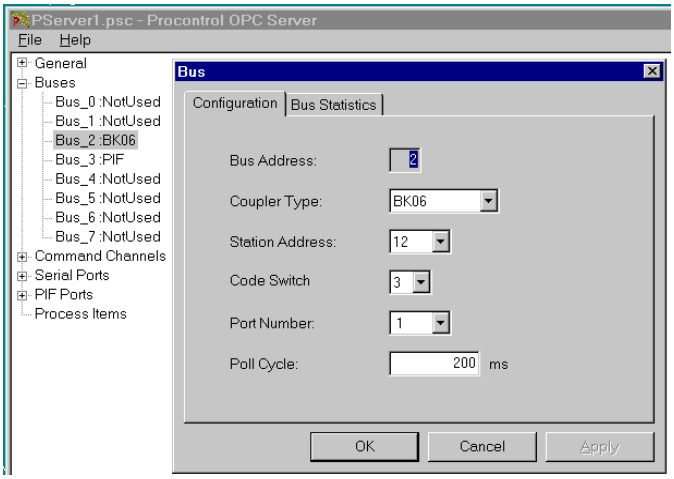


Figure 3-17: Property Page for Bus Configuration – Type BK06

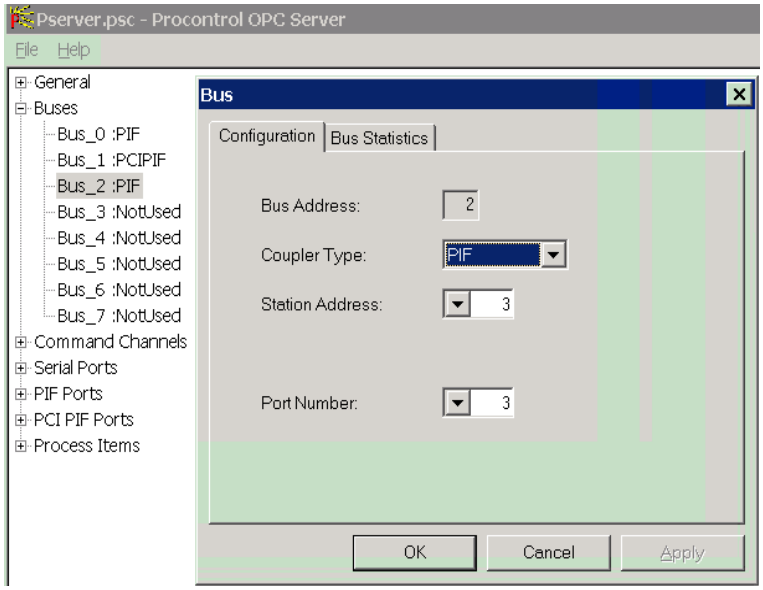


Figure 3-18: Property Page for Bus Configuration – Type PIF

Table 3-3: Bus Configuration Parameters

Name	Meaning	Allowed Values
Coupler Type	Type of bus coupler.	{BK06, PIF, PCI PIF, NotUsed}
Station Address[2]	Number (Address) of the coupling station. For PIF coupler, this address must match the station address configured on the PIF board.	0,…,3F
Port Number	Communication port (Serial or PIF) used for coupler.	BK06 : 1,…,8 PIF : 1,8
Poll Cycle	For BK06 only: Cycle in which BK06 should be polled. Depending on the number of addresses to be polled, the real poll cycle can be higher.	1,…,1000 milliseconds
Code Switch	For BK06 only: Setting of the code switch on the BK06 front panel.[3]	1,…,F

3.3.2.5 Command Channel Configuration

Command channels are used for VPC Mode “Telegram and ID-Signals” and “PRAUT80.13P”. It allows to define the addresses for the standard command telegrams XC11, XC12 and XC13. For detailed explanation of this telegrams see Figure 3-19.

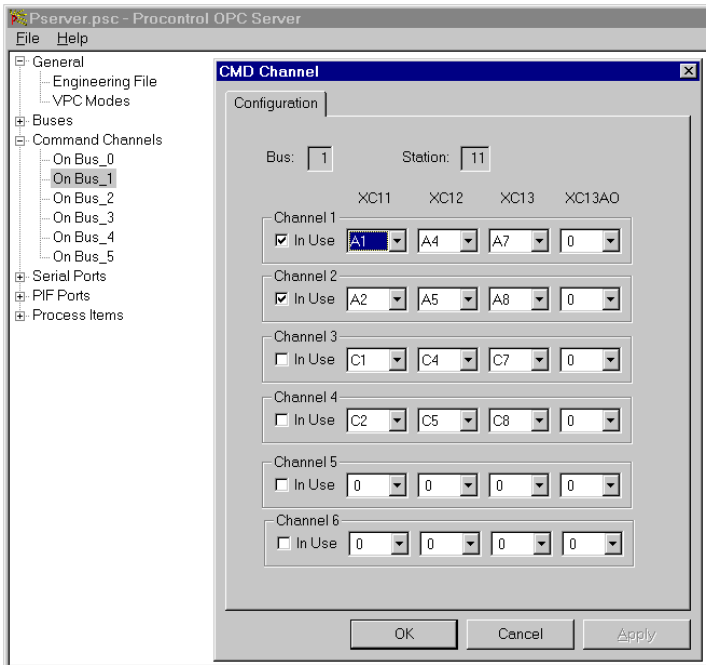


Figure 3-19: Property Page for Command Channel Configuration

Remark:
Command telegrams whose address is set to 0 are assumed not to be used.

[2] Output variables (DO, AO) whose station address do not match the station address of the bus will be ignored.
[3] It has to be observed, that the BK06 code switch setting must correspond to the Slave Number in the BK06’s PROM.

3.3.2.6 Serial Ports Configuration

A serial port must be associated to a BK06 coupled bus. The corresponding parameters can be specified in the corresponding property sheet.[4]

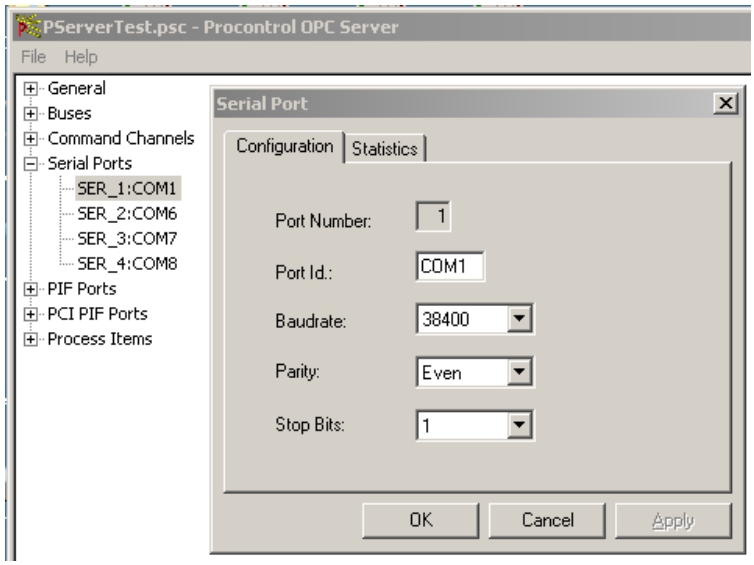


Figure 3-20: Property Page for Serial Port Configuration

Table 3-4: Serial Port Configuration Parameters

Name	Meaning	Allowed Values
Port Id.	Port identification	String, e.g. COM1, COM2, etc.
Baudrate	Baudrate for communication with BK06	38400, 19200, 9600, 4800, 2400
Parity	Parity check setting	None, Odd, Even
Stop Bitsy	Stop bits setting	1, 1.5, 2

[4] Several serial port parameters are fixed presets according to BK06 specification.

3.3.2.7 ISA PIF Port Configuration

A PIF port must be associated to a PIF coupled bus. The corresponding parameters can be specified in the corresponding property sheet.

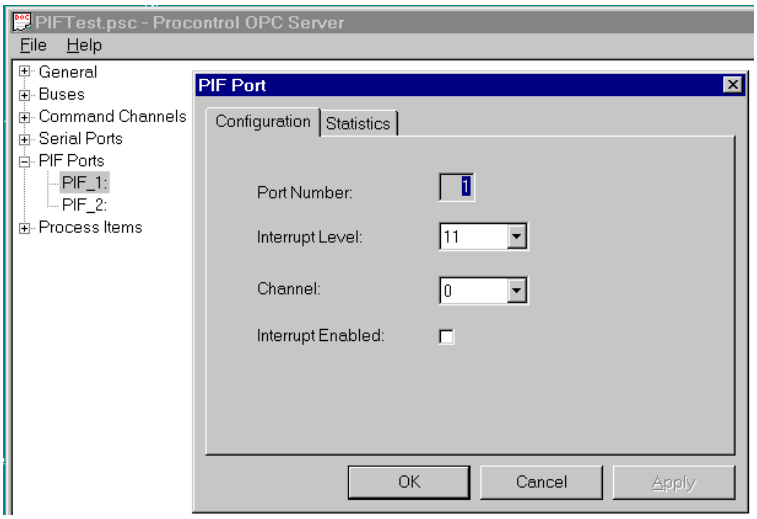


Figure 3-21: Property Page for ISA PIF Port Configuration

Table 3-5: ISA PIF Port Configuration Parameters

Name	Meaning	Allowed Values
Interrupt Level	Interrupt line used by this PIF, i.e. must correspond to setting of jumper W5 on the PIF hardware.	String, e.g. COM1, COM2, etc.
Channel	I/O address range used by this PIF, i.e. must correspond to setting of switch S1 on the PIF hardware.	0,1,..,F
Interrupt Enabled	Defines if communication with PIF FIFO should be based on interrupt mechanism. To disable the interrupt can avoid problems with no free IRQs	It is recommended not to enable PIF interrupt

3.3.2.8 PCI PIF Port Configuration

A PCI PIF port must be associated to a PIF coupled bus. The corresponding parameters can be specified in the corresponding property sheet. If no PCI PIF devices are detected, this property sheet is disabled.

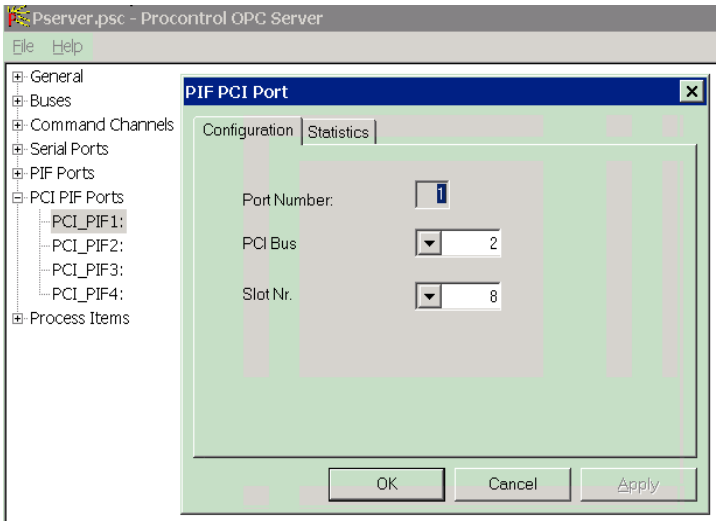


Figure 3-22: Property Page for PIF PCI Port Configuration

Table 3-6: PIF PCI Port Configuration Parameters

Name	Meaning	Allowed Values
PCI Bus	PCI bus nr detected for the device	Assigned from list
Slot Nr	PCI slot nr detected for this device	Assigned from list

3.3.3 Process Variables Engineering File

3.3.3.1 General

The Process Variable Engineering File (PVE-File) defines a parameters set for each PV to be instantiated in the PServer. The PVE file is a text file in CSV-format. It is read by the PServer at start-up. The CSV-format allows to generate the PVE-file by means of an appropriate MS-Office-based tool (Excel, Access). The “tool-approach” appropriate for a certain project must be selected according to the concrete engineering data situation.
Besides parameter sets associated with PVs, there are also global parameter sets which can be supplied through the PV engineering file.

```
# Example PVE Fil

# Digital Input
DI,19CKA21GK000_XS01,Digital Value 3,2,3,3F,1,(Trip),Trip,1,3

# Analog Input
AI,01ASP10AP010_XJ50,Analog Value ,2,3,7,0,0,200

# ASS Multi Function
ASS,01LCB20AP010_,Main Drain Valve
DI,01LCB20AP010_XL18,Open,2,3,2,5,(Open),Open,4,3
# The following DI has an Alias
DI,01LCB20AP010_XX19,Opening,2,3,2,6,,,,,01LCB20AP010_XL19
DI,01LCB20AP010_XL28,Closed,2,3,2,2,(Closed),Closed,4,3
DI,01LCB20AP010_XL29,Closing,2,3,2,3
DI,01LCB20AP010_XL68,Disturbed,2,3,2,8,(Disturbed),Disturbed,
```

Figure 3-23: Example of a PV Engineering File

3.3.3.2 PVE File Interface

Table 3-7: PVE File Interface Standard PVs

Name	Meaning	Allowed Values	Default	Pos.	AIAO	DIDO	CO
Type	Type of the PV or parameter set	AI, DI, AO, DO ASS, ASM, ASE, GSA VW2, VW3, VW4 # : Comment line Parameter set VPCID	-	1	x	x	x
Name	Name of the PV	Character string[5]	-	2	x	x	x
Descr	Description text	Character string	Name	3	x	x	x
Bus	Bus address	0,…,5	-	4	x	x	
Station[6]	Station address	0[7],…,3F	-	5	x	x	
Device	Device address	0,…,FF[8]	-	6	x	x	
Bit	Bit address	0,...,F	-	7		x	
RangeLow	Range low engineering unit	Number (float)	0	8	x		
RangeHigh	Range high engineering unit	Number (float)	100	9	x		
Text0	Text for Normal-state	Character string	0-State	8		x	
Text1	Text for Active-state	Character string	1-State	9		x	
Priority	Priority for events	1,…,4	4	10		x	
EventDef	Event definition	0: No message 1: Message for Normal->Active 2: Message for Active->Normal 3: Message both directions	0	11		x	
Alias	Alias name	Character string	-	12	x	x	
Output	Output connection[4] Outputs without output connection can be used e.g. as “calculated variables”.	{Y, N}	Y	13	x[9]	x[3]	x[10]
AssocPV	Process Variable associated with this one. Used to identify the PV for the associated setpoint value for analog control objects.	Name of a Process variable	-	14			x[11]
SpecProc	Special processing specifier: For some object types a special processing can be selected.	Character String, Example: UBCD1: Unsigned BCD from 1 word For complete list of available special processing see Table 3-22: Special Processing Identifiers		15	x[12]		
NormPos	Normal Position: Defines the normal (“not active”) position concerning event handling for digital variables.[13]	{0,1}	0	16		x	

3.3.3.3 PVE File Interface - Extended PVs

In the following tables only the additional parameters are listed.

[5] Naming convention must be observed to be able to use control objects and hierarchical browsing
[6] Output variables (DO, AO) whose station address do not match the station address of the bus will be ignored
[7] For output variables (DO, AO) station number 0 is interpreted as own station
[8] 0,…,1FF for BK06 coupling
[9] For Outputs only
[10] For CO Object this means “Is Operable”
[11] For analog control objects only
[12] For AI only
[13] The value itself will not be inverted

3.3.3.3.1 Signals (AIX, AOX, DIX, AOX)

Table 3-8: PVE File Interface Signals Extended

Name	Meaning	Allowed Values	Default	Pos.	AIX AOX	DIX DOX
Section	Process section	0,1,2,…	0	17	x	x
Inverted	Invert binary signal	Y, N, 1, 0	N	18		x
Unit	Measuring unit	Character string	-	18	x	
DRLow	Display range low	Number	RLow	19	x	
DRHigh	Display range low	Number	RHigh	20	x	
NoDecs	Number of decimal digits	0,1,2,…	2	21	x	
LimValue1	Value Limit 1	Number	DRLow/DRHigh	22	x	
LimValue2	Value Limit 2			23	x	
LimValue3	Value Limit 3			24	x	
LimValue4	Value Limit 4			25	x	
LimType1	Type Limit 1	0: Upper 1: Lower 2: No limit	2	26	x	
LimType2	Type Limit 2			27	x	
LimType3	Type Limit 3			28	x	
LimType4	Type Limit 4			29	x	
LimTreat1	Treatment Limit 1	0: No message 1: Message for Normal->Active 2: Message for Active->Normal 3: Message both directions	0	30	x	
LimTreat2	Treatment Limit 2			31	x	
LimTreat3	Treatment Limit 3			32	x	
LimTreat4	Treatment Limit 4			33	x	
LimPrio1	Priority Limit 1	0: State message 1,2,3: Alarm 4: State message	0	34	x	
LimPrio2	Priority Limit 2			35	x	
LimPrio3	Priority Limit 3			36	x	
LimPrio4	Priority Limit 4			37	x	
AlarmText1	Alarm Text Limit 1	Character string	>/<(LimValue1)	38	x	
NormText1	Normal Text Limit 1	Character string	</>(LimValue1)	39	x	
AlarmText2	Alarm Text Limit 2			40	x	
AlarmText2	Alarm Text Limit 2			40	x	
NormText2	Normal Text Limit 2			41	x	
AlarmText3	Alarm Text Limit 3			42	x	
NormText3	Normal Text Limit 3			43	x	
AlarmText4	Alarm Text Limit 4			44	x	
NormText4	Normal Text Limit 4			45	x	

3.3.3.3.2 Binary Control Objects (ASE, ASS, ASM)

Table 3-9: PVE File Interface Binary Control Objects Extended

Name	Meaning	Allowed Values	Pos.			
			Default	ASEX	ASSX	ASMX
SubType	Subtype	Any string. Special processing if containing the following substring: “TIP”: ASS Tip Mode	-	6 -	6 x	6 -
Section	Process section	0,1,2,…	0	4	4	4
Operable		Y,N,1,0	Y	5	5	5
XL68Signal	Signal for XL68	Signal reference	-	7	7	7
XL69Signal	Signal for XL69	Signal reference	-	8	8	8
XL18Signal	Signal for XL18	Signal reference	-	9	9	9
XL28Signal	Signal for XL28	Signal reference	-	10	10	10
XL19Signal	Signal for XL19	Signal reference	-	-	11	11
XL29Signal	Signal for XL29	Signal reference	-	-	12	12
RELON	Signal for Release ON	Signal reference	-	19		
RELOFF	Signal for Release OFF	Signal reference	-	20		
PROTON	Signal for Protection ON	Signal reference	-	21		
PROTOFF	Signal for Protection ON	Signal reference	-	22		
XC80Ref	XC80 Reference	See 3.4.5Support for XC80-Telegram	-	27	27	27

3.3.3.3.3 Analog Control Objects (ASIX, ASPX, HSTX, SWVX)

Table 3-10: PVE File Interface Analog Control Objects Extended

Name	Meaning	Allowed Values	Default	Pos.		
				ASIX/ASPX	HSTX	SWVX
Section	Process section	0,1,2,…	0	4	4	4
Operable		Y,N	Y	5	5	5
SubType	Subtype		-	6	6	6
XL68Signal	Signal for XL68	Signal reference	-	7	7	-
XL69Signal	Signal for XL69	Signal reference	-	8	8	-
XL18Signal	Signal for XL18	Signal reference	-	9	-	-
XL28Signal	Signal for XL28	Signal reference	-	10	-	-
XL19Signal	Signal for XL19	Signal reference	-	11	12	12
XL29Signal	Signal for XL29	Signal reference	-	12	13	13
XL79Signal	Signal for XL79	Signal reference	-	13	9	-
XL88Signal	Signal for XL88	Signal reference	-	14	10	-
XL89Signal	Signal for XL89	Signal reference	-	15	11	-
SPSignal	Signal for setpoint	Signal reference	-	16	16	16
CVSignal	Signal for control value	Signal reference	-	17	17	17
AVSignal	Signal for actual value	Signal reference	-	18	18	18
RELON	Signal for Release ON	Signal reference	-	19	-	-
RELOFF	Signal for Release OFF	Signal reference	-	20	-	-
PROTON	Signal for Protection ON	Signal reference	-	21	-	-
PROTOFF	Signal for Protection ON	Signal reference	-	22	-	-
XC80Ref	XC80 Reference	See 3.4.5 Support for XC80-Telegram	-	27	27	27

3.3.3.3.4 Group Control (GSA)

Table 3-11: PVE File Interface Group Control Object Extended

Name	Meaning	Allowed Values	Default	Pos.
Section	Process section	0,1,2,…	0	4
Operable		Y,N	Y	5
SubType	Subtype		-	6
XL68Signal	Signal for XL68	Signal reference	-	7
XL69Signal	Signal for XL69	Signal reference	-	8
XL18Signal	Signal for XL18	Signal reference	-	9
XL28Signal	Signal for XL28	Signal reference	-	10
XL19Signal	Signal for XL19	Signal reference	-	11
XL29Signal	Signal for XL29	Signal reference	-	12
XL59Signal	Signal for XL59	Signal reference	-	13

ActStepSignal	Signal for actual step	Signal reference	-	14
RELON	Signal for Release ON	Signal reference	-	19
RELOFF	Signal for Release OFF	Signal reference	-	20
PROTON	Signal for Protection ON	Signal reference	-	21
PROTOFF	Signal for Protection ON	Signal reference	-	22
StartON	1. Step for ON	1,2,3,…	1	23
LastON	Last Step for ON	1,2,3,…	50	24
StartOFF	1. Step number for OFF	1,2,3,…	51	25
LastOff	Last Step for OFF	1,2,3,…	99	26
XC80Ref	XC80 Reference	See *3.4.5 Support for XC80-Telegram*	-	27

3.3.3.3.5 Selector Control Objects (VW2X, VW3X, VW4X)

Table 3-12: PVE File Interface Selector Control Objects Extended

Name	Meaning	Allowed Values	Default	Pos.		
				VW2	VW3	VW4
Section	Process section	0,1,2,…	0	4	4	4
Operable		Y,N	Y	5	5	5
SubType	Subtype		-	6	6	6
XL68Signal	Signal for XL68	Signal reference	-	7	7	7
XL69Signal	Signal for XL89	Signal reference	-	8	8	8
XL19Signal	Signal for XL19	Signal reference	-	9	9	9
XL39Signal	Signal for XL39	Signal reference	-	10	10	10
XL59Signal	Signal for XL59	Signal reference	-	-	11	11
XL79Signal	Signal for XL79	Signal reference	-	-	-	12
XL18Signal	Signal for XL18	Signal reference	-	11	12	13
XL38Signal	Signal for XL38	Signal reference	-	12	13	14
XL58Signal	Signal for XL58	Signal reference	-	-	14	15
XL78Signal	Signal for XL78	Signal reference	-	-	-	16
XC80Ref	XC80 Reference	See *3.4.5 Support for XC80-Telegram*	-	27	27	27

3.3.3.3.6 Condition Definitions (CONDX, STEPX)

Table 3-13: PVE File Interface Condition Definitions

Name	Meaning	Allowed Values	Default	Pos.
LogicResult	Signal for Logic Result	Signal reference	-	4
Logic	Logic for condition	String	-	5

3.3.3.4 Specific Parameter Sets and Instructions

Because specific parameters sets do not create an object in the PServer but modify some global parameters, they can only appear once in a PV engineering file.

3.3.3.4.1 Parameter Set VPCID for ID-Signals Definition

The default signal codes designating the associated ID-Signals for a control object can be modified by means of this parameter definition.

Table 3-14: Record structure for PVE parameter set VPCID

Pos.	Meaning if two ID-Signals	Meaning if one ID-Signals	Default
2	Signal code channel 1 –ID Signal 1	Signal code channel 1 – ID Signal	XD91
3	Signal code channel 1 –ID Signal 2	Signal code channel 2 – ID Signal	XD92
4	Signal code channel 2 –ID Signal 1	Signal code channel 3 – ID Signal	XD93
5	Signal code channel 2 –ID Signal 2	Signal code channel 4 – ID Signal	XD94
6	Signal code channel 3 –ID Signal 1	Signal code channel 5 – ID Signal	XD95
…	…	…	

Example:

VPCID, XD91,XD92,XD93,XD94

3.3.3.4.2 Acknowledge Bit Definition VPCDEF ACKNBIT

In VPC mode “Telegram and ID-Signals”, the acknowledge bit in the command telegrams is normally located at position 7 (counting from 0). On certain P13 plants, another bit in the command telegram is used. For these cases, the acknowledge bit position can be defined in the pve-file with the following instruction:

VPCDEF, ACKNBIT,<BitPos>

Where
BitPos Position of the bit used for acknowledge (counted from 0)

Example:

VPCDEF, ACKNBIT,8

3.3.3.4.3 Parameter DMSID for DMS-Signal Definition

DMS designates the Drive Module Status function implemented on certain Procontrol P13 sites. With this parameter, the signal code for the DMS command signal can be defined. There is no default for the DMS command signal code, i.e. if this parameter definition is missing, the DMS-command has no effect.

If the DMS command signal is one of the ID-signals, a DMS command must signal must be set to “blocking” to ensure that the DMS command reserves the corresponding command channel as any other command. “Blocking” is specified by setting the second parameter to “Y”.

Examples 1:

DMSID,XD80
Non blocking DMS command signal

Attention:
The DMS-signal must be different from the ID-signals.

Examples 2:

DMSID,XD91,Y
Blocking DMS command signal, the DMS-signal is one of the ID-signals.

3.3.3.4.4 APPEND Instruction

The APPEND instruction causes the PServer to read another PVE-file after the current file has been processed completely.

Example:

APPEND, C:\OPC_P13\Data\BOP.pve

3.3.3.4.5 SERVER Instruction

The SERVER instruction allows to target the parameters sets to a certain server only. This can be useful for example for redundant configurations, where the parameters which have to be different (e.g. VPC ID-bit naming) on the redundant servers can be targeted to only one server, nevertheless the engineering files can be kept identical for both servers.

Examples:

SERVER, 2
This instruction causes all parameter sets following to be targeted to the server with Server ID = 2 only.
SERVER
This instruction causes all parameter sets following to be targeted to any server independent from the Server ID.

3.3.3.4.6 TELEGRAMERRORS Instruction

The TELEGRAMERRORS instructions allow to activate logging of telegram errors on P42 bus connected via PIF. For normal data acquisition, the PIF does suppress sporadic single errors (e.g. data word errors are ignored if not occurring for four successive bus cycles).

If telegram error logging is activated each single address or data error is reported as event message.

The following options are provided:

A:	Address error logging
D:	Data error logging
N:	No telegram error logging (default)

Examples:

TELEGRAMERRORS,A,D
Telegram errors of type A and D are logged.

TELEGRAMERRORS,N
Telegram error logging is switched off.

Remark:
Telegram error logging can be activated or switched off for a running OPC server by means of loading an appropriate pve-file (only containing a corresponding *TELEGRAMERRORS* instruction*)* through the command *Load PVs…* .

3.3.3.4.7 STATUSERRORS Instruction

The STATUSERRORS instructions allows to activate logging of status errors of data words on P42 bus connected via PIF. Status error logging does only log data errors passing the error filtering functions of the PIF, i.e. errors which also invalidate corresponding PVs connected to the data word.

The following options are provided:

A:	Address error logging
D:	Data error logging
T:	Sensor disturbance logging
N:	No status error logging (default)

Examples:

STATUSERRORS,A,D,T
Status errors of type A ,D and T are logged.

STATUSERRORS,N
Status error logging is switched off.

Remark:
Status error logging can be activated or switched off for a running OPC server by means of loading an appropriate pve-file (only containing a corresponding *STATUSERRORS* instruction*)* through the command *Load PVs…* .

3.3.3.4.8 PRIORITYMAP Instruction

The PRIORITYMAP defines mapping of priorities to severities. In the engineering data a priority attribute can be defined for limits and digital values. The alarm and event OPC server provides severities instead of priorities. For the default priority-severity mapping see 3.5.1.23.5.1.2

Format:
PRIORITYMAP, <Sever1>, <Sever2>, <Sever3>, <SeverElse>
Where:
Sever<n>: Severity for priority n

Example:

PRIORITYMAP, 1000,750,500,1

3.3.3.4.9 PARTNERNODE[X] Instruction

The PARTNERNODE instruction defines the partner node in redundant configurations. (See 3.8 Redundancy Support).

Format:
PARTNERNODE, <NodeName>, [<ConDelay>], [<RetryCycle>]

Where:
NodeName: Name of the partner node
ConDelay: Delay after OPC server start-up for connection to partner node in seconds.
Default: 30
RetryCycle: Cycle time for retry if connection failed or for partner server supervision node in seconds.
Default: 30

Examples:

PARTNERNODE, ConServer02
PARTNERNODE, ConServer02,60,60

To activate also the bus connection controlled redundancy switch-over (see 3.8.4 Bus Connection Controlled Redundancy Switch-Over) one has to use the extended partner node instruction:

Examples:

PARTNERNODEX, ConServer02
PARTNERNODEX, ConServer02,60,60

3.3.3.4.10 Station Disturbance Word Handling Instructions

In Procontrol P13 plants, P13 stations can maintain a so-called Station Disturbance Word in the bus coupler BK02. The bits of this word correspond to disturbance states within the station.

The original station disturbance word can only be accessed via a dedicated service address. For disturbance indication and alarming, the value of the station disturbance word is copied to the normal address space in the BK02. Nevertheless the station disturbance word must be reset from a either a diagnostic station or, from the HMI.
For the HMI, this station disturbance word reset mechanism can be provided by the OPC server. The OPC server can also provide the station disturbance word as an OPC item of the Station object as also the necessary OPC items for the AIP Status Viewer.

Remark:
The station disturbance related OPC items (station disturbance word, AIP Status Viewer items) can also be provided for BK06 coupling. For BK06 coupling, no automatic reset feature is provided.
The station disturbance word handling has to be configured by the STATIONMONITOR and the STATION instruction. For each bus to be monitored a STATIONMONITOR instruction is required and for each station to be monitored a STATION directive is required.

STATIONMONITOR instruction for reset feature:
STATIONMONITOR,<Bus>,<DT>,<SA>,<NA>,[<CYC>],[<TO>],[<DL>]
STATIONMONITOR instruction without reset feature:
STATIONMONITOR,<Bus>,,,<NA>

Where:
Bus: Bus number (0,…,7)
DT: Address of diagnostic triple (Hex)
SA: Service address for disturbance word reset (Hex)
NA: Address of copy of station disturbance word in normal area (Hex)
CYC: Processing cycle in seconds, default: 5
TO: Time out cycle (see PIF description), default: 1
DL: Debug level, default 0
0: no debug messages
1: Resets are logged

Examples:

STATIONMONITOR,2,3,4
Activates station disturbance word handling with reset feature on bus 2 via diagnostic triple at 3 with service address 4. The normal address for the disturbance word is to be defined in the STATION directive.

STATIONMONITOR,1
Activates station without reset feature. The normal address for the disturbance word is to be defined in the STATION directive.

Remark:
The service address is usually at

- 4 for systems planned with Progress
- 10 (HEX) for systems planned with EDS-P3

For each station to be monitored, a corresponding STATION instruction must be present.
STATION,<Bus>,<Station>,[<SA>],[<NA>]

Where:

Bus:	Bus number (0,…,7)
Station:	Station (Hex)
SA:	Service address for disturbance word reset (Hex), default from STATIONMONITOR instruction.
NA:	Address of copy of station disturbance word in normal area (Hex), default from STATIONMONITOR instruction.

Example:

STATION,2,1A,,F5
STATION,2,1B,,8E
STATION,2,1C,,ED
On bus 2, the stations 1A, 1B and 1C will be monitored. The normal addresses for the disturbance word are F5, 8E, ED respectively. If the reset feature is active is determined by the STATIONMONITORING instruction.

Remarks:

- Resets are sent cyclically with the cycle CYC. Reset requests are only sent, if the station disturbance word (NA copy) is not zero or if it is invalid respectively not available.
- Station disturbance word handling is only available via PIF connection.
- Be careful to define diagnostic triple, service address correctly according to the configuration in the Procontrol P13 plant to avoid disturbances.
- The service address (SA) is usually at
  - 4 for systems planned with Progress
  - 10 (HEX) for systems planned with EDS-P3

3.3.3.4.11 LIMHYST Instruction

The LIMHIST instruction defines the hysteresis value for analog limit monitoring.
The hysteresis value has to be given as positive integer per mille value. The per mille value is from the display range or, if this is zero, from the measuring range.

Example:

LIMHYST, 20
Defines a limit hysteresis of 20 %o

If no LIMHYST instruction is given, the limit hysteresis is set to 10%o (= 1%).

3.3.3.4.12 AEOPTIONS Instruction

The AEOPTIONS instruction allows to define options concerning handling of alarm and event messages. The options value has to be given as 16 bit positive integer defining a corresponding option pattern:

AEOPTIONS, <Pattern as integer>,[<bracket pattern>]
Currently the following options are supported:

Table 3-15: AEOPTIONS Instruction

Bit Position	Value	Meaning
0	1	Use actual state text as message description (instead of Description of the PV)
2	2	Use bracketed active text as inactive text for condition events. Bracketed active text uses the bracket pattern to generate the inactive text. The bracket pattern can be an arbitrary string containing the "#" character. The inactive text will then be generated ^by replacing "#" in the bracket pattern by the active text: Example AEOPTIONS,3,[#] Will provide for an active text TRIP an inactive text [TRIP]
3	4	Send no-alarm (Priority<>1,2,3) process messages as OPC simple events.
4	8	Provides condition events with a custom event attribute *SimpleCondition*. This attribute is set to true for no-alarm (Priority<>1,2,3) process messages. This attribute is used by 800xA PPA to handle condition events as simple events.
5	16	Provides process events with a custom event attribute *ProcessSection*. This attributes provides the process section of the event source.
6	32	Provides command tracking messages as simple events instead as tracking messages.

Examples:

AEOPTIONS,1

- Use actual state text as message description

AEOPTIONS,57

- Use actual state text as message description
- Send no-alarm process events as condition events with event attribute SimpleEvent=true.
- Provide process events with ProcessSection attribute
- Command tracking messages as simple messages.
- => **Recommended for 800xA**

AEOPTIONS,7 ,(#)

- Use actual state text as message description
- Use bracketed active text as inactive text
- Send no-alarm process messages as OPC simple events
- => **Recommended for SPlus**

3.3.3.4.13 INCHTO Instruction (Inching Timeout)

With the INCHTO instruction, the timeout for inching commands can be defined. If an inching command is not terminated by a corresponding hold command, it is automatically terminated by the Inching Timeout. The Inching Timeout is given in seconds. Default value for inching timeout is 30.
Example:

INCHTO, 60

This defines an Inching Timeout of 60 seconds.

Inching timeout is active for PIF and BK03 coupling. Inching timeout is not active for VPC mode "Individual Command Signals".

3.3.3.4.14 PIFCMDTO Instruction (PIF Command Timeout)

The PIF Command Timeout is intended to ensure a command signal reset in situations where the PIFs host PC is not able to do the regular reset anymore.
With the *PIFCMDTO* instruction, the timeout for active PIF command signals can be defined. A zero PIF Command Timeout means that the PIF Command Timeout is not active.
If PIF Command Timeout is active, the PIF command timeout value is determined as follows:

- For inching commands, it is taken from the inching timeout value (see 3.3.3.4.13 INCHTO Instruction (Inching Timeout))
- For non-inching commands it is taken from the PIF Command Timeout

If a PIF command signal is not deactivated by a corresponding command reset within the PIF Command Timeout value, the PIF automatically resets the command signal. The PIF Command Timeout is given in seconds. Default value for the PIF Pulse Timeout is 0, i.e. PIF Pulse Timeout is not active.

Example:

PIFCMDTO, 1
This defines a PIF Pulse Timeout of 1 second.

Remark:
If inching and non-inching commands are active at the same time on the same P13 word, for the timeout for both command types the inching timeout is used.

3.3.3.4.15 ExtendedLogging Instruction

With the ExtendedLogging instruction, the number of log files kept in the PServer logging directory (see3.6.3PServer Log Files) can be increased. The ExtendedLogging instruction causes keeping of a circular set of PServer log files additionally to the standard log files. The number of files in this file set can be configured via the ExtendedLogging directive.
ExtendedLogging,<NoOfFiles>
Where:
NoOfFiles: Number of additional files to be kept (default 20)

3.3.4 DCOM Configuration to Access PServer Remote or as Service

Via DCOM a client can connect to a PServer residing on a remote node. A precondition to enable access of PServer remote or as service is, that the corresponding DCOM security settings are made correctly. The detailed settings which provide optimal security may depend on the specific network situation as also from the platform environment (Operating System, Industrial IT etc.).

3.4 OPC Data Access

3.4.1 General

Roughly spoken, the OPC Data Access standard defines functions allowing to “read & write” process data. The underlying concept for these data access functions is the OPC Item. Apart from access to OPC Item Properties explained later, an OPC client can only access data which is provided as OPC Item by the OPC Server. An OPC Item has an name and is comprised of value, quality and time stamp.

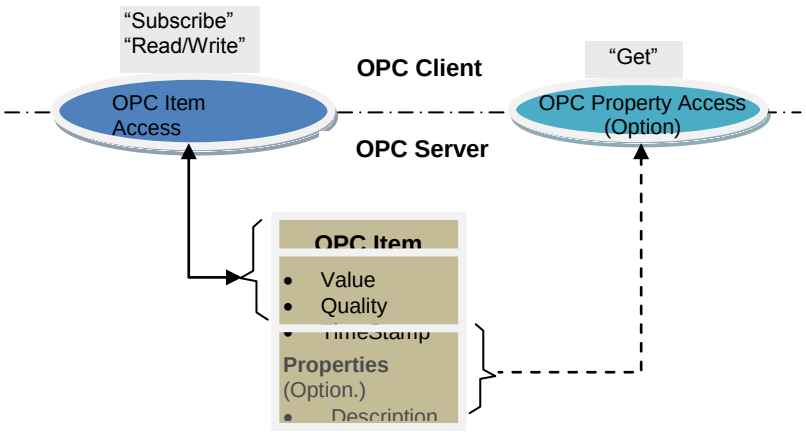


Figure 3-24: Data Access and OPC Items

Many OPC clients do not support the data access to OPC item properties, i.e. the access via OPC items is often the only way to get data into an OPC client. It is therefore essential to know which data an OPC server exposes through OPC Items and possibly which through Item properties.
The PServer provides data for process variables as also for raw Procontrol data (data words).

The properties of PVs are also exposed as OPC Item Properties. Therefore the PServer provides also some “static” data (e.g. Description text) as OPC items.

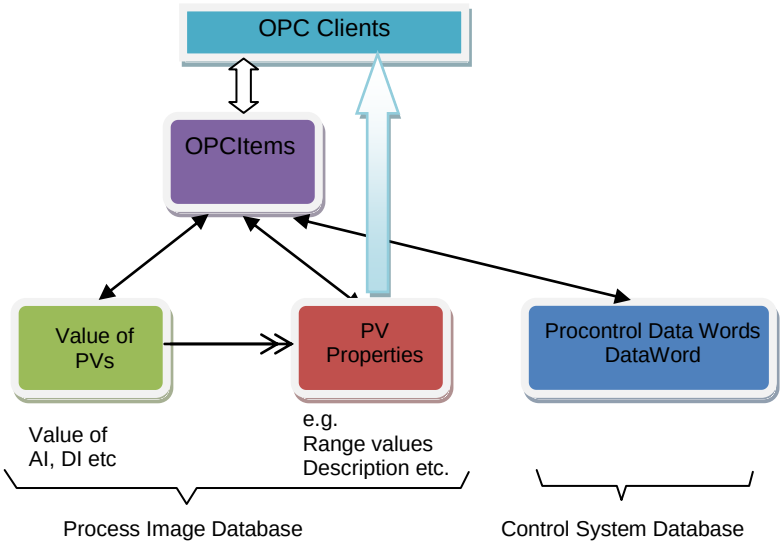


Figure 3-25: Conceptual View on Data exposed by PServer

OPC Data Access 2.0 defines an interface, *GetItemProperties,* which allows to read data from a server which is not exposed as OPC items but as OPC properties.

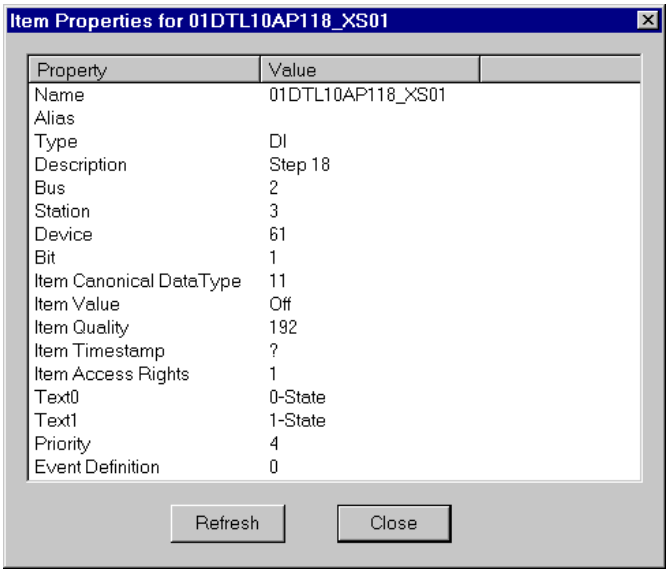


Figure 3-26: Item Properties for a DI shown in an OPC Client

3.4.1.1 Naming Conventions for OPC Items

The PServer introduces an “object concept” via a corresponding naming concept for OPC items.
<Object>_<Part>.<Property>
Part and property level are optional. This means that it gives object-, part- and property-level OPC items.

Note
As every OPC item has value, quality and timestamp also every of the above mentioned types have these standard OPC attributes.

Examples:

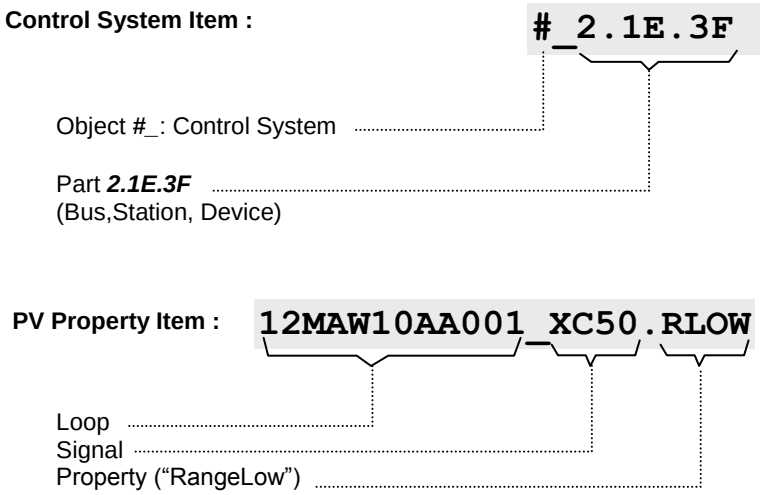


Figure 3-27: Examples for PServer naming conventions for OPC items

The naming convention for OPC items associated with PVs is of course derived from the naming conventions for PVs (see 3.4.2.2 Naming Conventions for Process Variables).
For properties supported by a certain PV type see Chapter 3.7 PV Definitions.

3.4.2 Data Access for Process Image

3.4.2.1 Data model

The OPC standard does not define much on an “application data model”, i.e. a data model reflecting some sort of objects and there relations.

The PServer can provide two views on the data of a Procontrol system. The Process Image view represents the process controlled by Procontrol as a collection of process variables. A Process Variable (PV) is a named object representing a Process Signal or a Control Object. A Process Signal is a process variable representing an analog (AI, AO) or binary (DI, DO) value. A Control Object is a process variable representing a control function with associated commands and feedback signals.

The object classification for the process image view is shown in the following picture:

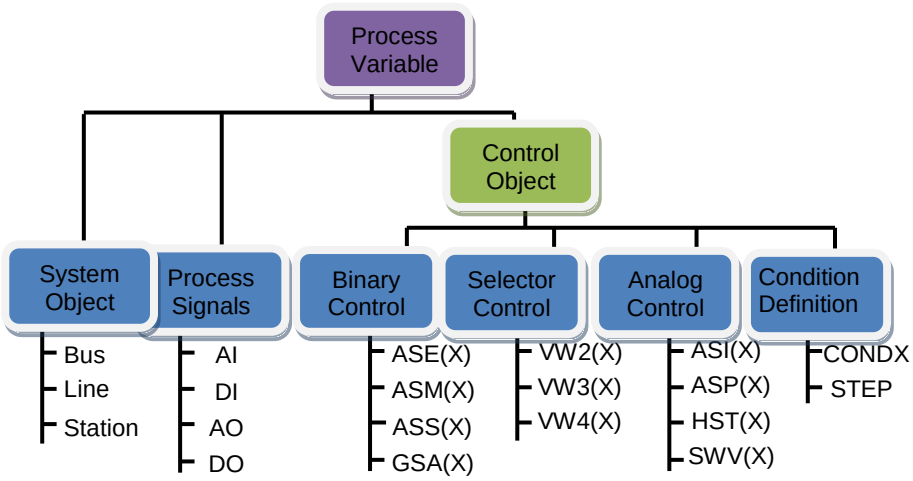


Figure 3-28: Classification of Process Variables

For further description of the individual control object types see the corresponding Procontrol documentation on multifunction.

Control objects implement the corresponding commands and give access to the associated feedback signals. To issue a command, some object individual identification signals are sent Procontrol[14]. The association of these feedback and identification signals to its control object is defined by a corresponding naming convention for PVs.

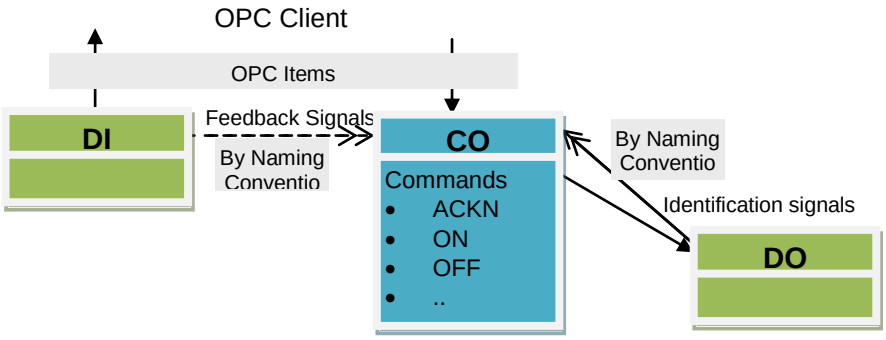


Figure 3-29: Control Objects and associated Signals

3.4.2.2 Naming Conventions for Process Variables

As mentioned above a specific naming convention is assumed in respect to control objects. Control objects are associated with several individual process variables. In particular the necessary feedback information is provided as a set of DI process signals. Similarly identification signals are represented as DO process signals. The compositional view on a CO object is achieved by an appropriate naming convention:

Control object id:
Control object name (Alpha-numeric string, typical 12 characters) ending with "_".

- Name of associated Signals:
  <*ControlObjectName*>_<*SignalCode*>
  where:
  ControlObjectName Name of the control object, 12 characters
  SignalCode: Code for Signal
- Signal Code
  This convention is defined in [PMSMimicSignal].[15]

Example:

- Control object: 12MAW10AA001
- Control object id: 12MAW10AA001_
- DI of feedback "Manual": 12MAW10AA001_XL78
- DI of feedback "Open" 12MAW10AA001_XL18
- OPC Item for "Close command" 12MAW10AA001_CMD_OPEN[16]

This naming convention allows building generic object GUI components (Faceplates, Symbols) per control object type. This means, that for such components, only the control object name has to be provided. The individual signal items can be referenced by the signal code relatively to the object name.

[14] The details of object identification depends on the VPC mode used for a site.
[15] The PServer adds additional "signal codes" for commands
[16] Command OPC Items correspond to properties of the control object but not to an individual PV.

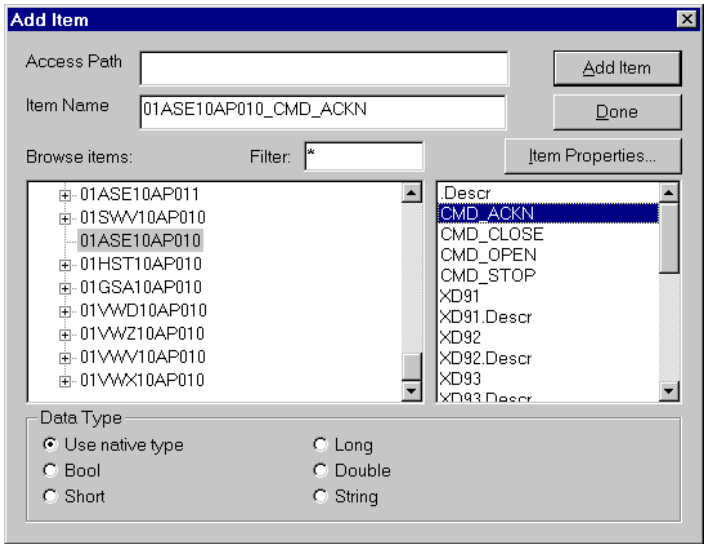


Figure 3-30: OPC Items for an ASE Control Object in a browser

To follow this naming convention is a matter of engineering and must be observed when building the object GUI components.

Because naming convention as described above has not been observed consequently within projects and not in all projects the same signal names have been used, a mechanism to map existing signal names to a unified naming convention must be provided. This is achieved by the possibility to optionally provide an alias name to process variables (except CO variables). By using Extended PVs (see3.4.2.3Extended Process Variables), this concept is supported in a convenient way.

If an alias name is given for a PV, this PV has two names in the process image database and as OPC item. This allows having a PV under the same name as it had within the old system also in case this original name does not fulfill the control object naming convention.

The naming convention for PVs is also mapped to the naming convention for the corresponding OPC items. Therefore see also *3.4.1.1 Naming Conventions for OPC Item*.

3.4.2.3 Extended Process Variables

For process signals and control objects two PV types are provided:

- Standard PV
  These types provide basic value processing and event processing. Configuration of feedback signals for a control object is not possible.
- Extended PV
  Extended PVs provide some additional functionality and additional attributes. In particular the feedback signals for a control object are individually configurable.
  Extended PVs have the type identification of the corresponding standard PV with an “X” appended.

3.4.3 Access to Control System Data

3.4.3.1 General

The control system database contains an image of the control system data on the connected local stations. The PServer exposes the Procontrol data words as data items. These data items follow the naming convention as shown in the following diagram.

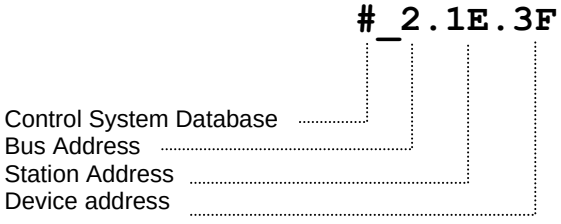


Figure 3-31: Naming Convention for Control System data Items

The value for control system data items is provided as integer. The access rights for control system data items are defined as “readable & writeable”.

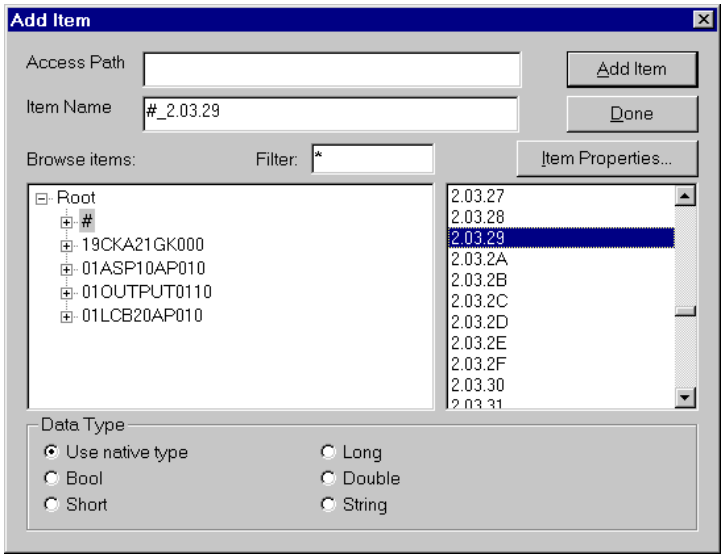


Figure 3-32: Browsing Control System Items

Note:
For each configured BK06 connection, the corresponding control system data items are created automatically by the PServer. For a PIF connection, at least one PV must be configured for each station for which control system data items should be created.

3.4.3.2 Handling of Control System Status Data

For buses and stations a corresponding data word indicating the error status of the subsystem is provided. The bus status word is identified by the virtual station STAT, the station status word is identified by the virtual device STAT. The meaning of the status word values is defined in the following table.

Table 3-16: Bus and station status word meaning

Bit		Meaning
0	1-15	
1	*	Disturbed
0	*	OK

The status words can be accessed as PC items as illustrated in the following picture.

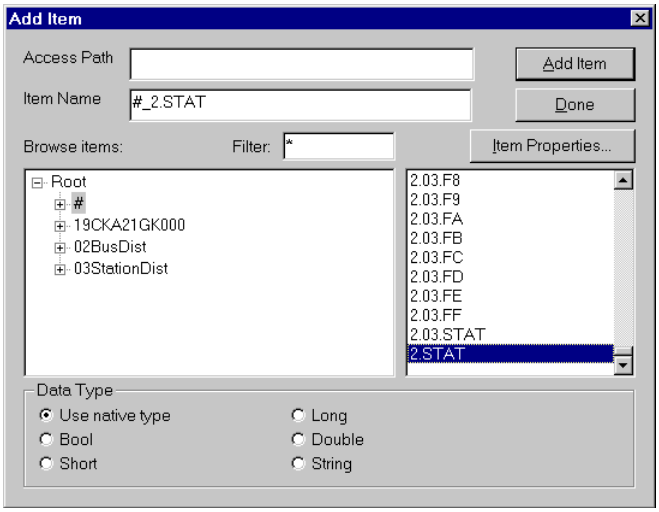


Figure 3-33: Bus and station status word shown in an item browser

If required, DIs can be associated to bus and station status word bits. This is illustrated in the following example records for the PVE file.

```
# Bus disturbance DI for Bus 2
DI,02BusDist_XS01,Bus 2 Disturbance,2,STAT,,0,(Disturbed),Disturbed,1,3

# Station disturbance DI for Station 2.3
DI,03StationDist_XS01,Station 2.3 Disturbance,2,3,STAT,0,(Disturbed),Disturbed,1,3
```

Figure 3-34: Example of PVE entries for usage of status words

3.4.4 Specific OPC Items

3.4.4.1 PServerAdmin_Node OPC Item

The *PServerAdmin_Node* item returns the name of the node, where the OPC Server is running.

3.4.4.2 PServerAdmin_Command OPC Item

The *PServerAdmin_Command* item allows issuing certain commands by writing a corresponding command string to the item.

Commands:

- AcknSigErrs Acknowledges all signal errors
- SetSuspend Set server state to “Suspended”
- SetRunning Set server state to “Running”

3.4.4.3 PServerAdmin_EventRate OPC Item

The *PServerAdmin_EventRate* provides the number of events/second reported to a client.

3.4.4.4 PServerAdmin_ActiveBuses, PServerAdmin_ActiveBusesPrtn OPC Item

The *PserverAdmin_ ActiveBuses* provides the number active buses. The *PserverAdmin_ ActiveBusesPrtn* provides the number active buses of the partner server. These items are only available if extended partnernode communication is configured.

3.4.5 Support for XC80-Telegram

3.4.5.1 General

The P13 control functions corresponding to the PServer control objects provide their state information for the control room via the so-called XC80-telegram. The XC80 telegram provides information on the position and mode of the object as also on its disturbances states. This information is represented by corresponding bits in the 16 bit word telegram.
In older P13 plants, not the whole XC80- telegram was available to the HMI for state annunciation but only a subset of the bits in the XC80-telgram indicating the position and mode information. These bits are then provided as binary input signals (DIs) with signal code XLxx. The reason for this approach was either to reduce the amount of signals in the HMI database or to reduce the amount of signals on the P13 buses or both. In some of these plants, the XC80 telegram for a control object can be requested via a corresponding command on a single multiplexed address. This function is called DMS.

In newer P13 plants and also some of the older ones, the XC80 telegram would be available for the HMI. This means, additional disturbance information can be provided without the DMS function. Providing the XC80 telegram via OPC has the following advantages

- Disturbance information without needing DMS
- Less OPC items to be subscribed -> better performance
- Less DI signals to be loaded, in particular less objects counting for 800xA License[17]

Generated XC80-Telgram
In cases, in which the XC80-Telegram is not provided, the PServer can put together the available part of the XC80-Telegram from the available feedback signals to a generated XC80-Telegram. This allows providing to clients an interface to the control objects feedback information independent from whether this information is provided as individual signals or as a telegram.

3.4.5.2 Configuration of XC80 - Telegram

3.4.5.2.1 XC80DEF Instruction

This instruction allows defining the mode for the XC80 acquisition and in case of XC80 provided from bus a corresponding address reference.

XC80DEF, <Mode>,[<AddrRefs>],[XC80Option]

Where:

Mode:	Bus:	Telegram provided by bus
	Generate:	Generate telegram based on feedback signals
AddrRefs:	List of signal codes, separated with"/" defining the potential signal references for the telegram address. Address will be taken from the first signal found. Default: **&_XL68/&_XL18/&_XL19** This means, if, for a control object, a corresponding signal is found with one of these signal codes, the XC80 address is take from this signal.	
XC80Option:	NoXL[18]: Load only XL signals with events.	

Examples:
XC80DEF,`Bus,&_XL68/&_XL18`
XC80 telegram is provided by bus, the address is provided by XL68.
XC80DEF,`Generate`
XC80 telegram is generated based on available feedback signals

3.4.5.3 Object Individual XC80 Configuration

For control objects whose XC80 configuration differs from that defined with the XC80DEF instruction, an individual configuration can be made in the XC80 field in the control object configuration record.

[17] DIs used for events (e.g. XL68) have to be loaded also when using XC80.
[18] This parameter is not observed by the OPC server but controls the pve-generation in the engineering workbook !

Table 3-17: Object IndividualXC80 Configuration

Field	Position [19]	Meaning	
XC80Ref	27	Generate:	Generate XC80
		<AddrRef>	From bus with address reference AddrRef

3.4.5.4 OPC Item Interface for XC80 Telegram

The information concerning the XC80-Telegram is provided via corresponding OPC items as shown in the table.

Table 3-18: OPC Items for XC80 Information

OPC Item	Meaning		
	Value	Quality	
.XC80Tel	XC80 Telegram	GOOD	Defined and not disturbed bits show good value
		BAD	Telegram invalid due to invalid XC80 reference
		NOT_CONNECTED	No XC80 configured
.XC80Def	Which bits are defined	GOOD	Defined bit information valid
		NOT_CONNECTED	No XC80 configured
.XC80Dist	Which bits are disturbed	GOOD	Disturbed bit information valid
		NOT_CONNECTED	No XC80 configured
.XC80Bus	Bus address	GOOD	XC80 Address configured
		NOT_CONNECTED	XC80 Address not configured
.XC80Station	Station address	GOOD	XC80 Address configured
		NOT_CONNECTED	XC80 Address not configured
.XC80Device	Device address	GOOD	XC80 Address configured
		NOT_CONNECTED	XC80 Address not configured

3.5 OPC Alarm & Event

3.5.1 General

3.5.1.1 Event Categories

The event categories provided by PServer and the corresponding OPC Server:

Table 3-19: Event categories provided by PServer

Event Category	Description	OPC Event Type		
		Condition	Tracking	Simple
Process Message	Value events for PVs	x		
Signal Message	Quality events for PVs	x		
Limit	Limit events for analog PVs	x		
Command Message [Simple]	Operator commands to process		x	[x]
System Message	PServer system messages			x
System Event	PServer system events (Alarms)	x		
Event Suppression	Event suppression messages	x		

3.5.1.2 Priorities and Severities

The mapping of PV priorities to OPC severities is done according to the following table:

[19] 1-based

Table 3-20: Mapping of priorities to OPC severities

Priority	Meaning	OPC Severity
0	Status	1
1	Alarm	999
2	Warning	699
3	Disturbance	399
4	Status	1

This default mapping can be changed with the PRIORITYMAP Instruction.

3.5.1.3 Acknowledge

Event Category	Acknowledge Required
Process	For priority 1,2,3
Signal	Yes
Limit	For priority 1,2,3
Command	For priority 1,2,3
System	No

3.5.2 Messages

3.5.2.1 Process Messages

Process messages are provided for value changes of digital variables (DI and DO). Limit events of analog variables are not supported. Process messages are indicated with condition *Status.*

For process messages, the status texts, priority and message definition can be configured (see *3.3.3.2 PVE File Interface).*

Example:
DI,01DTL10AP102_XS01,Digital Test Signal, 2,3,60,1,**Off**,**On**,**4**,**3**

Date	Time	Source	Message	Severity	Condi...	Status
12/06/99	12:08:03.710	01DTL10AP102_XS01	Digital Test Signal	1	Status	On
12/06/99	12:08:04.912	01DTL10AP102_XS01	Digital Test Signal	1	Status	Off

Figure 3-35: Example of process messages in an OPC alarm & event client

3.5.2.2 Signal Messages

Signal messages are provided for changes in the value quality for process signals. Signal messages are indicated with condition *Signal.*

Date	Time	Source	Message	Severity	Condi...	Status
12/06/99	14:47:19.591	19CKA21GK000_XS01	Digital Value 3	999	Status	Off
12/06/99	14:47:23.076	19CKA21GK000_XS01	Digital Value 3	200	Signal	Disturbed
12/06/99	14:47:26.140	19CKA21GK000_XS01	Digital Value 3	200	Signal	OK
12/06/99	14:47:26.140	19CKA21GK000_XS01	Digital Value 3	999	Status	Off

Figure 3-36: Example of signal messages in an OPC alarm & event client

3.5.2.3 Limit Messages

Limit messages are provided for analog signals if a configured limit value is crossed according to the corresponding limit treatment parameter. Limit messages are indicated with the condition *Limit1*, *Limit2*, *Limit3* or *Limit4*.

Date	Time	Source	Message	Severity	Condition	Status
07/08/03	10:48:22.551	01ANR10AC108_XJ01	Analog Calculated Value 8	399	Limit3	> 75.000000
07/08/03	10:48:41.097	01ANR10AC108_XJ01	Analog Calculated Value 8	399	Limit4	> 95.000000
07/08/03	10:48:57.351	01ANR10AC108_XJ01	Analog Calculated Value 8	399	Limit4	(> 95.000000)
07/08/03	10:49:07.145	01ANR10AC108_XJ01	Analog Calculated Value 8	399	Limit3	(> 75.000000)

Figure 3-37: Example of limit messages in an OPC alarm & event client

3.5.2.4 Command Messages

Command messages are provided for commands issued against a control object. Process signals. Command messages are indicated with source *User.*

Date	Time	Source	Message	Severity	Condition	Status
12/06/99	14:57:34.184	User	Command: 01LCB20AP010_CMD_OPEN	1		
12/06/99	14:57:34.615	01LCB20AP010_XL28	Closed	1	Status	(Closed)
12/06/99	14:57:36.508	01LCB20AP010_XL18	Open	1	Status	Open

Figure 3-38: Example a command messages in an OPC alarm & event client

3.5.2.5 System Messages

System messages are provided to report for system events as simple messages.

Date	Time	Source	Message	S...	Con...	Status
12/06/99	15:03:35.945	19CKA21GK000_XS01	Digital Value 3	200	Signal	Disturbed
12/06/99	15:03:36.175	System	BK06 disturbed (PortNo, StationNo): 1, 3	1		
12/06/99	15:03:37.116	System	BK06 communication ok (PortNo, StationNo) : 1, 3	1		
12/06/99	15:03:37.116	19CKA21GK000_XS01	Digital Value 3	200	Signal	OK

Figure 3-39: Example of system messages in an OPC alarm & event client

3.5.2.6 System Events

System events are provided to report system events as alarms.

Date	Time	Source	Message	Severity	Condition	Status
11/02/09	10:31:05.901	BUS 6	Disturbed	999	Conn.@CH_PRU801	Disturbed
11/02/09	10:31:27.717	BUS 6	Disturbed	999	Conn.@CH_PRU802	Disturbed
11/02/09	10:31:49.604	BUS 6	OK	999	Conn.@CH_PRU801	Disturbed

Figure 3-40: Example of system events in an OPC alarm & event client

3.6 Operation

3.6.1 General

For operation of PServer corresponding items in the *Procontrol OPC Server* menu are provided.

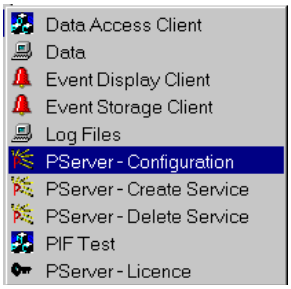


Figure 3-41: Procontrol OPC Server Menu Items

Diagnostic messages can be found in the Message Window of PServer (see 3.6.2 User Interface) and in PServer's Log Files (see *3.6.3 PServer Log Files).*
PServer can run in two modes:

- Configuration Mode
  In the configuration mode the user interface of PServer is accessible on the desktop. This allows to modify the site configuration parameters and also view the message window (3.6.2 User Interface). Nevertheless a PServer running in configuration mode will terminate when the current user logs out! Therefore the configuration mode is mainly useful during configuration and test phase or if PServer should run only as long as the user is logged on. PServer can be started in configuration mode by the Procontrol OPC Server menu item *PServer – Configuration* or automatically by a client if PServer is not installed as NT service.

  PServer start in configuration mode is recorded in the message log with the following message:

  ```
  01/05/00 12:13:32.215 PServer launched as windows application...
  ```

- Service Mode

  In service mode, PServer runs as a Windows NT service. As a service, PServer remains running also if no user is logged on Windows NT. On the other hand, the user interface of PServer running in service mode is not accessible. To enable PServer to run in service mode, it must be installed as NT-service. This can be achieved by selecting the Procontrol OPC Server menu item *PServer – Create Service.* To prevent PServer from being started in service mode, select Procontrol OPC Server menu item *PServer – Delete Service.*
  PServer start in service mode is recorded in the message log with the following message:

  ```
  01/05/00 16:52:35.832 PServer launched as NT Service..
  ```

  To check if the PServer is installed as NT service, check the list of services (*Start->Settings->Services*).

Important
To enable access of the PServer as service, the corresponding DCOM configurations have to be set correctly (see3.3.4DCOM Configuration to Access PServer Remote or as Service).

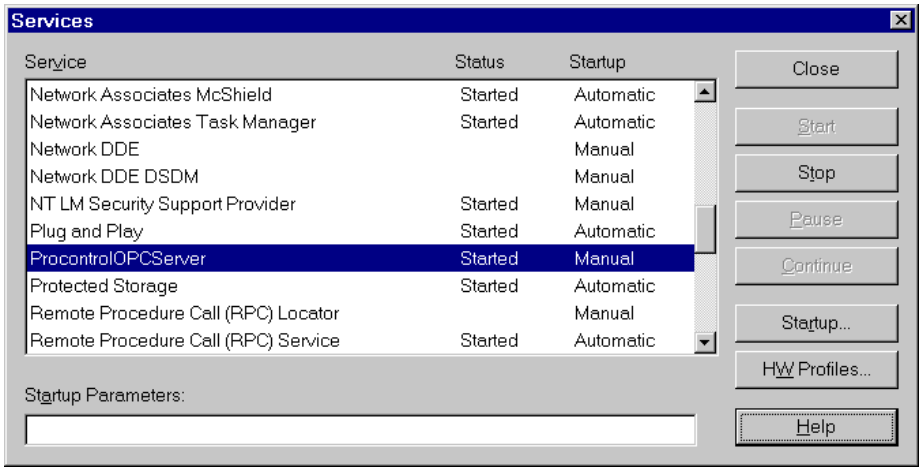


Figure 3-42: Procontrol OPC Server installed as Windows NT Service

The normal way to start PServer in service mode is automatically by a client or automatic at start up. Manual start or stop can be done through the NT Services dialog as shown *in Figure 3-42: Procontrol OPC Server installed as Windows NT Service.*

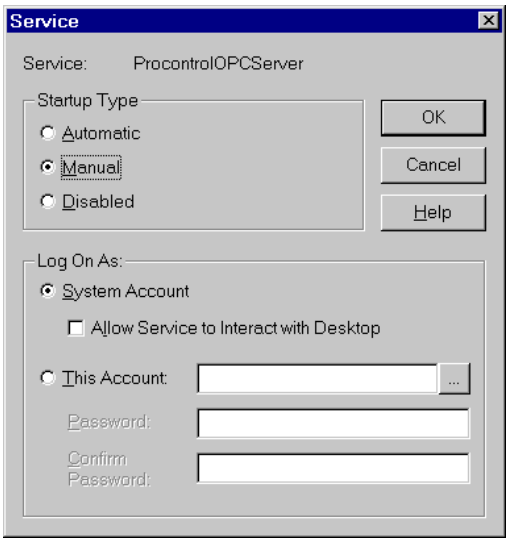


Figure 3-43: Property setting for Procontrol OPC Server Service

Important
Do not mark *"Allow service to Interact with Desktop"* , otherwise PServer will stop if you log out ! Selecting "Automatic" Startup type is only necessary if you wish PServer starting up with Windows NT.

Normally only one instance of PServer is started. To allow viewing of PServer site configuration without stopping a PServer running in service mode, a PServer instance in configuration mode can run in parallel to one running in service mode.

Important
When using PServer in configuration mode, some attention should be paid that clients do not connect to the “wrong” server.

Rule:
If PServer is installed as service, any client will connect to PServer in service mode unless a running PServer in configuration mode is or was already connected to a client. A “normal” procedure could look like the following:
Test Phase ->

1. Select *PServer-Delete Service* to disable service mode (not necessary if just installed).
2. Select *PServer-Configuration* to start PServer in configuration mode.
3. Enter the site configuration parameters as needed.
4. Save and exit from PServer.
5. Start PServer either by *PServer-Configuration* or by connecting a client.
6. Test the new configuration by clients and observing the message window. Repeat from (3.) if needed.
7. If configuration ok, stop PServer
8. Select *PServer-Create Service*
9. Connect a client and examine corresponding message log

-> Test phase finished.

3.6.2 User Interface

The PServer application window contains two panes:

- Configuration parameter tree
  This tree leads to the corresponding site parameter property sheets as described in 3.3.2 Site Configuration Parameters.
- Message Window
  Informational and error messages are written to this window. The newest message is on the top of the window.

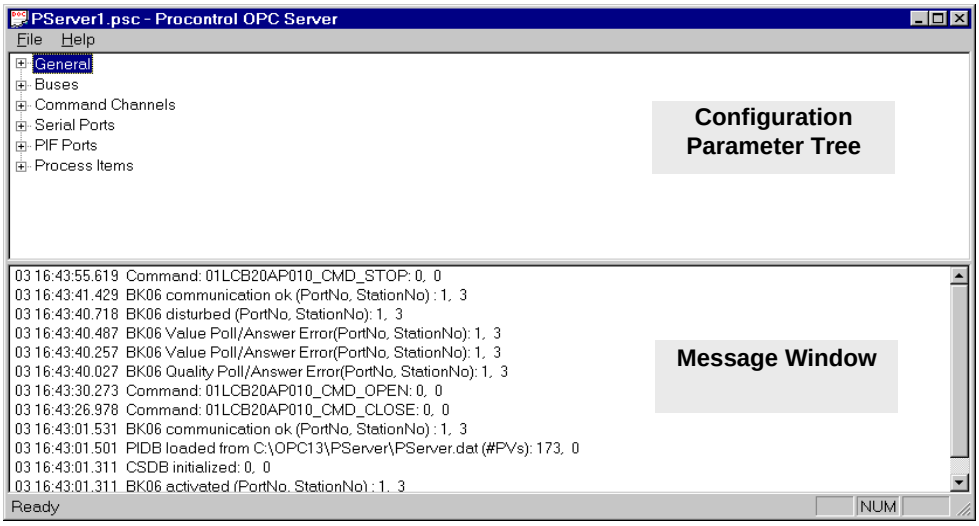

PServer1.psc - Procontrol OPC Server
File Help
General
Buses
Command Channels
Serial Ports
PIF Ports
Process Items
Configuration Parameter Tree
03 16:43:55.619 Command: 01LCB20AP010_CMD_STOP: 0, 0
03 16:43:41.429 BK06 communication ok (PortNo, StationNo) : 1, 3
03 16:43:40.718 BK06 disturbed (PortNo, StationNo): 1, 3
03 16:43:40.487 BK06 Value Poll/Answer Error(PortNo, StationNo): 1, 3
03 16:43:40.257 BK06 Value Poll/Answer Error(PortNo, StationNo): 1, 3
03 16:43:40.027 BK06 Quality Poll/Answer Error(PortNo, StationNo): 1, 3
03 16:43:30.273 Command: 01LCB20AP010_CMD_OPEN: 0, 0
03 16:43:26.978 Command: 01LCB20AP010_CMD_CLOSE: 0, 0
03 16:43:01.531 BK06 communication ok (PortNo, StationNo) : 1, 3
03 16:43:01.501 PIDB loaded from C:\OPC13\PServer\PServer.dat (#PVs): 173, 0
03 16:43:01.311 CSDB initialized: 0, 0
03 16:43:01.311 BK06 activated (PortNo, StationNo) : 1, 3
Message Window
Ready
NUM

Figure 3-44: PServer Application Window

3.6.3 PServer Log Files

PServer writes the diagnostic messages also to a corresponding log file named Messages.log. The size of the log file is restricted to about 5000 messages (200 Kbytes). If this limit is reached, the current log file is renamed to Messagesold.log. The menu Procontrol OPC Server -> Log Files opens the directory containing these files.

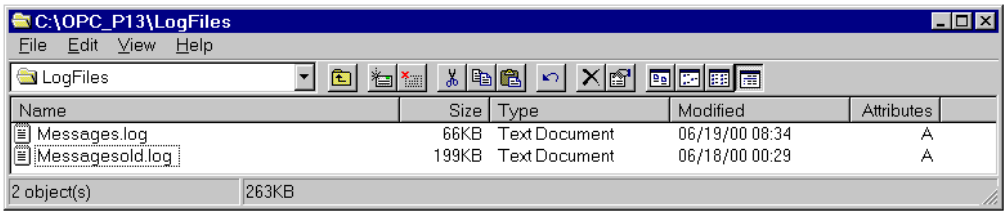

C:\OPC_P13\LogFiles
File Edit View Help
LogFiles
Name Size Type Modified Attributes
Messages.log 66KB Text Document 06/19/00 08:34 A
Messagesold.log 199KB Text Document 06/18/00 00:29 A
2 object(s) 263KB

Figure 3-45: PServer Log Files

The PServer log files are text files which can be viewed by any text editor.
With the ExtendedLogging instruction, the number of log files kept on disk can be extended (see *3.3.3.4.15 ExtendedLogging Instruction*).

3.6.4 Data Access Test Client

For testing the installation concerning data access, a simple OPC Data Access client can be used.

- Start : Start-> ABB P13 Connect OPC Server -> Data Access Client
- In the OPC Client, connect to PServer by OPC -> Connect…

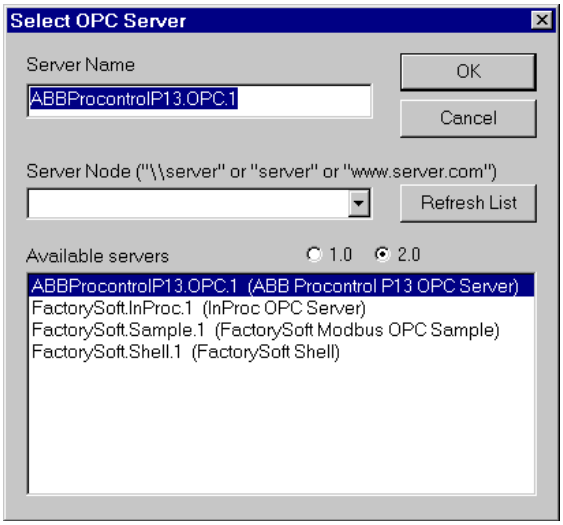


Figure 3-46: Connecting a data access client to the PServer

With *OPC->Add Item*…add items. The added items can then be examined in the main window.

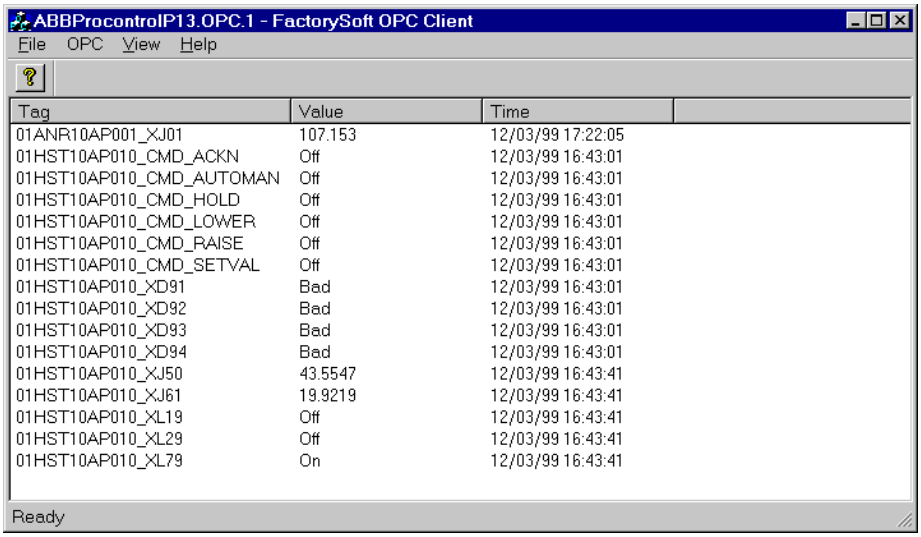


Figure 3-47: View on OPC Items of PServer in a client

3.6.5 Event Test Client

For testing the installation concerning event & alarm access, an OPC alarm & event client can be used.

- Start : Start -> ABB P13 Connect OPC Server -> Event Display Client
- In the OPC Client, connect to PServer by OPC -> Connect…
  Remark: The alarm & event test client connects automatically to the last connected server (if possible).

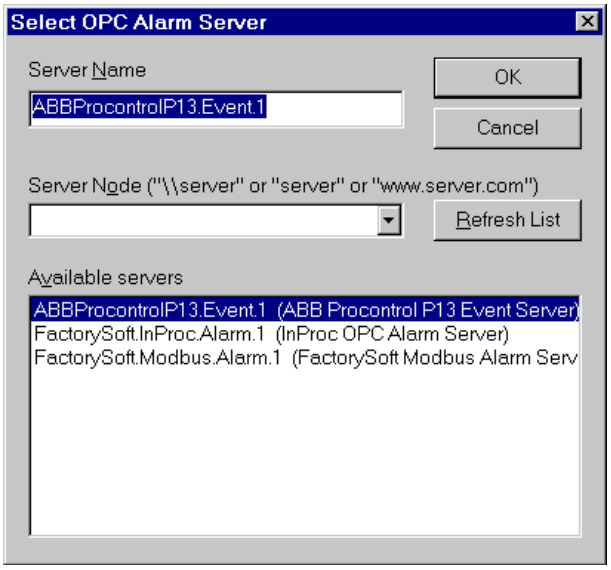


Figure 3-48: Connecting an alarm & event client to the PServer

3.7 PV Definitions

3.7.1 General

Process variables have a set of properties which can be classified as follows:

- Descriptive attributes
  These properties have no influence on processing and are provided as engineering parameters, e.g. Description text
- Processing parameters
  These properties have influence the processing and are provided as engineering parameters, e.g. Procontrol address.
- Dynamic process values
  These properties depend dynamically on process values, e.g. actual value.
- Commands
  These properties allow to issue commands toward a control object

Table 3-21: Common Attributes for Process Variables

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Name	Original name of PV	String	x	x	
Alias	Alias name for aggregation to control object	String	x	x	
Description	Descriptive Text	String	x	x	*Descr*
Paddress[20]	Procontrol address of data source/ destination				
Bus	Bus address	0,…,7	x	x	
Station	Station address	0,…,3F	x	x	

[20] Is default associated OPC Item

	Device	Device address	0,…,FF (1FF)[21]	x	x	
	Bit	Bit address	0,…,F	x	x	
OPC Item		OPC Item value with				x[22]
	Value	OPC item value	Variant: Analog: Double Digital: Boolean		x	
	Quality	OPC quality flags indicating the quality of the value	Bitset		x	
	TimeStamp	Time stamp of last update	UTC Time (FILETIME)		x	
SpecProc		Special processing specifier[23]	String	x	x	

Table 3-22: Special Processing Identifiers

Identifier	Meaning	AI	DI	AO	DO
UBCD1	Data word is interpreted as unsigned BCD coded	x			
UBCD8L	Left byte of data word is interpreted as unsigned BCD coded	x			
UBCD8H	Right byte of data word is interpreted as unsigned BCD coded	x			
UKSU	Adapt range for KSU connection	x			
UNOSTB	Handle bit 0 as normal value bit and not as sensor disturbance bit	x			
CMD	Command pulse output				

3.7.2 Process Signals

3.7.2.1 Analog Inputs (AI)

Table 3-23: Specific Attributes for Analog Inputs

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
RangeLow	Measuring range low	Double	x	x	*RLow*
RangeHigh	Measuring range high	Double	x	x	*RHigh*

3.7.2.2 Digital Inputs (DI)

Table 3-24: Specific Attributes for Digital Inputs

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Text0	Measuring range low	String	x	x	
Text1	Measuring range high	String	x	x	
Priority	Priority	Integer 1,…,3	x	x	
EventDef	Event definition	Integer 0,…,3	x	x	
NormPos	Normal position	Integer 0,1	x	x	

[21] Range 100,…,1FF (Hex) only for BKO6 Bus Type.
[22] As part of Value Item.
[23] Currently only UBCD1 supported for AI to process unsigned BCD input

3.7.2.3 Analog Outputs (AO)

Table 3-25: Specific Attributes for Analog Outputs

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
RangeLow	Measuring range low	Double	x	x	Rlow
RangeHigh	Measuring range high	Double	x	x	Rhigh
Output	Output connection	Bool	x	x	

3.7.2.4 Digital Outputs (DO)

Table 3-26: Specific Attributes for Digital Outputs

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Text0	Measuring range low	String	x	x	
Text1	Measuring range high	String	x	x	
Priority	Priority	Integer 1,…,3	x	x	
EventDef	Event definition	Integer 0,…,3	x	x	
Output	Output connection	Bool	x	x	
NormPos	Normal position	Integer 0,1	x	x	

3.7.3 Process Signals Extended

3.7.3.1 Analog Inputs Extended (AIX)

Table 3-27: Specific Attributes for Analog Inputs Extended

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Ackn	Object is acknowledged: Reset by limit alarm or signal error	Bool			*Ackn*
AlarmText1	Alarm text for limit 1	Character	x		*AlarmText1*
AlarmText2	Alarm text for limit 2	Character	x		*AlarmText2*
AlarmText3	Alarm text for limit 3	Character	x		*AlarmText3*
AlarmText4	Alarm text for limit 4	Character	x		*AlarmText4*
CMD_ACKN	Acknowledge command	Short			*CMD_ACKN*
DRHigh	Display range high	Double	x		*DRHigh*
DRLow	Display range low	Double	x		*DRLow*
Error	Set if object has signal error	Bool			*Error*
LimPrio1	Priority for limit 1	Short	x		*LimPrio1*
LimPrio2	Priority for limit 2	Short	x		*LimPrio2*
LimPrio3	Priority for limit 3	Short	x		*LimPrio3*
LimPrio4	Priority for limit 4	Short	x		*LimPrio4*
LimState1	State for limit 1	Short			*LimState1*
LimState2	State for limit 2	Short			*LimState2*
LimState3	State for limit 3	Short			*LimState3*
LimState4	State for limit 4	Short			*LimState4*
LimTreat1	Treatment for limit 1	Short	x		*LimTreat1*
LimTreat2	Treatment for limit 2	Short	x		*LimTreat2*
LimTreat3	Treatment for limit 3	Short	x		*LimTreat3*
LimTreat4	Treatment for limit 4	Short	x		*LimTreat4*
LimType1	Type for limit 1	Short	x		*LimType1*
LimType2	Type for limit 2	Short	x		*LimType2*
LimType3	Type for limit 3	Short	x		*LimType3*
LimType4	Type for limit 4	Short	x		*LimType4*
LimitValue1	Value for limit 1	Double	v		*LimitValue1*
LimitValue2	Value for limit 2	Double	x		*LimitValue2*
LimitValue3	Value for limit 3	Double	x		*LimitValue3*
LimitValue4	Value for limit 4	Double	x		*LimitValue4*
NoDecs	Number of decimal digits	Short	x		*NoDecs*
NormText1	Normal text for limit 1	Character	x		*NormText1*
NormText2	Normal text for limit 2	Character	x		*NormText2*
NormText3	Normal text for limit 3	Character	x		*NormText3*
NormText4	Normal text for limit 4	Character	x		*NormText4*
Rlow	Measuring range low	Double	x	x	*Rlow*
Rhigh	Measuring range high	Double	x	x	*Rhigh*
Section	Section	Short	x		*Section*

Unit	Measuring unit	Character	x		*Unit*

3.7.3.2 Digital Inputs Extended (DIX)

Table 3-28: Specific Attributes for Digital Inputs

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Ackn	Object is acknowledged: Reset by limit alarm or signal error	Bool			Ackn
Text0	Measuring range low	String	x	x	*NormalText*
Text1	Measuring range high	String	x	x	*AlarmText*
Priority	Priority	Integer 1,…,3	x	x	*Prio*
EventDef	Event definition	Integer 0,…,3	x	x	*EventTreat*
NormPos	Normal position	Integer 0,1	x	x	*NormPos*
Inverted	Input value inverted	Bool	x		*Inverted*
EventSup	Event suppression	Integer			*EventSup*

3.7.3.3 Analog Outputs Extended (AOX)

Table 3-29: Specific Attributes for Analog Outputs

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
See AIX	…				
Output	Output connection	Bool	x	x	

3.7.3.4 Digital Outputs Extended (DO)

Table 3-30: Specific Attributes for Digital Outputs

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Text0	Measuring range low	String	x	x	
Text1	Measuring range high	String	x	x	
Priority	Priority	Integer 1,…,3	x	x	
EventDef	Event definition	Integer 0,…,3	x	x	
Output	Output connection	Bool	x	x	
NormPos	Normal position	Integer 0,1	x	x	

3.7.4 Control Objects

3.7.4.1 Naming Conventions for Associated Signals

Control object individual command signals are associated to the object by corresponding naming conventions. For VPC Mode 1, these signals are the identification signals. The following table shows the default naming convention use by PServer. This default naming convention can be overwritten by a corresponding VPCID record in the PV engineering file (see *3.3.3* Process Variables Engineering File)

Table 3-31: Default Naming Convention for Identification Signals in VPC Mode 1[24]

Signal	Description	Signal Code
ID1.1	Channel 1 – ID Signal 1	XD91
ID1.2	– ID Signal 2	XD92
ID2.1	Channel 2 – ID Signal 1	XD93
ID2.2	– ID Signal 2	XD94
ID3.1	Channel 3 – ID Signal 1	XD95
ID3.2	– ID Signal 2	XD96
ID4.1	Channel 4 – ID Signal 1	XD97
ID4.2	– ID Signal 2	XD98
ID5.1	Channel 5 – ID Signal 1	XD99
ID5.2	– ID Signal 2	XD9A
ID6.1	Channel 6 – ID Signal 1	XD9B
ID6.2	– ID Signal 2	XD9C

Table 3-32: Naming Convention for Individual Command Signals in VPC Mode 2

Signal	Description	Signal Code
ON	Command ON	XD11
OFF	Command OFF	XD12
RAISE	Command RAISE	XD13
LOWER	Command LOWER	XD14
HOLD	Command HOLD	XD15
SELECT1	Preselect 1	XD61
SELECT2	Preselect 2	XD63
SELECT3	Preselect 3	XD65
SELECT4	Preselect 4	XD67

3.7.4.2 Specific Attributes for Control Objects

3.7.4.2.1 General

Table 3-33: Specific Attributes for Control Objects

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Operable	Is Operable	Bool	x		

3.7.4.2.2 Binary Control (BCO)

Table 3-34: Specific Attributes for Binary Control Objects

[24] Default configuration can be overwritten by a corresponding record in the PV engineering file

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
ACKN	Acknowledge Command	Bool			*CMD_ACKN*
AUTOMAN	Auto/Manual Command	Bool			*CMD_AUTOMAN*
ON	On/Open Command	Bool			*CMD_ON*[25]
OFF	Off/Close Command	Bool			*CMD_OFF*[26]
STOP[27]	Stop Command	Bool			*CMD_STOP*
DMS	DMS Command	Bool			*CMD_DMS*

3.7.4.2.3 Selector Control (SCO)

Table 3-35: Specific Attributes for Selector Control Objects

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
ACKN	Acknowledge Command	Bool			CMD_ACKN
SEL1	Select 1	Bool			CMD_SEL1
SEL2	Select 2	Bool			CMD_SEL2
SEL3[1]	Select 3	Bool			CMD_SEL3
SEL4[1]	Select 4	Bool			CMD_SEL4
DMS	DMS command	Bool			CMD_DMS

3.7.4.2.4 Analog Control (ACO)

Table 3-36: Specific Attributes for Analog Control Objects

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
ACKN	Acknowledge Command	Bool			CMD_ACKN
AUTOMAN[1]	Auto/Manual Command	Bool			CMD_AUTOMAN
RAISE	Raise Command	Bool			CMD_RAISE
LOWER	Lower Command	Bool			CMD_LOWER
HOLD	Hold Raise/Lower Command	Bool			CMD_HOLD
SETVAL[1]	Set Value (Y/W) Command	Float			CMD_SETVAL
DMS	DMS command	Bool			CMD_DMS
AssocPV	Name of PV associated with this object	String	x		
RangeLow	Range low for setpoint output	Float	[28]	x	
RangeHigh	Range low for setpoint output	Float	[29]	x	

3.7.4.3 Specific Attributes for Control Objects Extended

3.7.4.3.1 General

Table 3-37: Specific Attributes for Control Objects Extended

[25] CMD_OPEN for ASS
[26] CMD_CLOSE for ASS
[27] Depending on subtype, some commands are not applicable.
[28] Derived from associated PV, =0 if PV not specified
[29] Derived from associated PV, =100 if PV not specified

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Operable	Object is operable	Bool	x		Operable
Station	Station number	String			Station
Type	PV Type	String	x		Type
SubType	Subtype	String	x		SubType
Error	Set if signal error in one of the feedbacks	Short			Error
XC80Tel	See 3.4.5 Support for XC80-Telegram	UI2			XC80Tel
XC80Def		UI2			XC80Def
XC80Dist		UI2			XC80Dist
XC80Bus		I2	(x)		XC80Bus
XC80Station		String	(x)		XC80Station
XC80Device		String	(x)		XC80Device

3.7.4.3.2 Binary Control (ASE, ASS, ASM)

Table 3-38: Specific Attributes for Binary Control Objects

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item	ASE	ASM ASS	GSA
ACKN	Acknowledge Command	Bool			*CMD_ACKN*	*x*	*x*	*x*
AUTOMAN	Auto/Manual Command	Bool			*CMD_AUTOMAN*			
ON	On/Open Command	Bool			*CMD_ON*[30]	*x*	*x*	
OFF	Off/Close Command	Bool			*CMD_OFF*[31]	*x*	*x*	
STOP[32]	Stop Command	Bool			*CMD_STOP*			
DMS	DMS Command	Bool			*CMD_DMS*	*x*	*x*	*x*
PROTOFF	Signal reference for Protection OFF	String			*PROTOFF*	*x*	*x*	*x*
PROTON	Signal reference for Protection ON	String			*PROTON*	*x*	*x*	*x*
RELOFF	Signal reference for Release OFF	String			*RELOFF*	*x*	*x*	*x*
RELON	Signal reference for Release ON	String			*RELON*	*x*	*x*	*x*
XL18	XL18 signal PV	DI			*(see DIX)*	*x*	*x*	*x*
XL19	XL19 signal PV	DI			*(see DIX)*	*x*	*x*	*x*
XL28	XL28 signal PV	DI			*(see DIX)*	*x*	*x*	*x*
XL29	XL29 signal PV	DI			*(see DIX)*	*x*	*x*	*x*
XL68	XL68 signal PV	DI			*(see DIX)*	*x*	*x*	*x*
XL69	XL69 signal PV	DI			*(see DIX)*	*x*	*x*	*x*

[30] CMD_OPEN for ASS
[31] CMD_CLOSE for ASS
[32] Depending on subtype, some commands are not applicable.

XL59	XL59 signal PV	DI			*(see DIX)*			*x*
AV	Actual Step	AI			*(see AIX)*			*x*

3.7.4.3.3 Selector Control (VW2, VW3, VW4)

Table 3-39: Specific Attributes for Selector Control Objects

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
ACKN	Acknowledge Command	Bool			CMD_ACKN
SEL1	Select 1	Bool			CMD_SEL1
SEL2	Select 2	Bool			CMD_SEL2
SEL3[1]	Select 3	Bool			CMD_SEL3
SEL4[1]	Select 4	Bool			CMD_SEL4
DMS	DMS command	Bool			CMD_DMS
XL18	XL18 signal PV	DI signal PV			(see DIX)
XL19	XL19 signal PV	DI signal PV			(see DIX)
XL28	XL28 signal PV	DI signal PV			(see DIX)
XL29	XL29 signal PV	DI signal PV			(see DIX)
XL58	XL58 signal PV	DI signal PV			(see DIX)
XL59	XL59 signal PV	DI signal PV			(see DIX)
XL78	XL78 signal PV	DI signal PV			(see DIX)
XL79	XL79 signal PV	DI signal PV			(see DIX)

3.7.4.3.4 Analog Control (ACO)

Table 3-40: Specific Attributes for Analog Control Objects

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item	ASP ASI	HST	SWV
ACKN	Acknowledge Command	Bool			CMD_ACKN			
AUTOMAN[1]	Auto/Manual Command	Bool			CMD_AUTOMAN			
RAISE	Raise Command	Bool			CMD_RAISE			
LOWER	Lower Command	Bool			CMD_LOWER			
HOLD	Hold Raise/Lower Command	Bool			CMD_HOLD			
SETVAL[1]	Set Value (Y/W) Command	Float			CMD_SETVAL			
DMS	DMS command	Bool			CMD_DMS			
AssocPV	Name of PV associated with this object	String	x					
RangeLow	Range low for setpoint output	Float	[33]	x				
RangeHigh	Range low for setpoint output	Float	[34]	x				
XL18	XL18 signal PV	DI			(see DIX)			
XL19	XL19 signal PV	DI			(see DIX)			
XL28	XL28 signal PV	DI			(see DIX)			
XL29	XL29 signal PV	DI			(see DIX)			
XL68	XL68 signal PV	DI			(see DIX)			
XL69	XL69 signal PV	DI			(see DIX)			

[33] Derived from associated PV, =0 if PV not specified
[34] Derived from associated PV, =100 if PV not specified

XL79	XL79 signal PV	DI			(see DIX)			
XL88	XL88 signal PV	DI			(see DIX)			
XL89	XL89 signal PV	DI			(see DIX)			

3.7.4.3.5 Condition Definitions (COND, STEP)

The Condition Definition object types do not involve any processing within PServer. It provides engineering data via OPC server to a client.

Table 3-41: Attributes for Condition Definitions (COND, STEP)

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item
Descr	Description	String			Descr
Error	Error	Short			Error
Logic	Logic expression	String			Logic
LogicResult	Signal reference to logic result	String			LogicResult

3.7.5 System Objects

3.7.5.1 General

Procontrol system objects of type Bus, Line and Station will be created in the PServer, when a signal is defined in the pve-file which references this object within its Procontrol address.

Table 3-42: Procontrol System Objects

System Object Type	Meaning	Object Name
Bus	An Procontrol P42 intraplant bus which can be connected to multiple station	BUS <n> Examples: BUS 0 BUS 1
Line	A serial connection to one station	LINE <n> Examples: LINE 0 LINE 1
Station	A Procontrol P13 station	<b>-STN<XX> where b : Bus address (0,1,2,..) XX: Station address (hex) Examples: 1-STN15 3-STNEF

Table 3-43: Attributes for Procontrol System Objects

Name	Meaning	Data Type	Engin. Para.	OPC Prop.	OPC Item	Bus	Line	Station
Description	Description	String			.Descr	x	x	x
Error	Error state	Bool			.Error	x	x	x
S_STATUS	0 : Ok >0 : Error	Short			S_STATUS	x	x	x
S_TIME	Time of last status change	Date			S_TIME	x	x	x

S_XDESCRIPTION	Object type specific error code	Short			S_XDESCRIPTION	x	x	x
DistWord	Station Disturbance Word	Short			.DistWord			x
Message Rate	Number of telegram messages per second provided by the PIF	Short			.MsgRate	x		

The object-specific error codes are described in the following tables:

Table 3-44: Error codes for BUS object

Error Code (S_XDESCRIPTION)	Meaning	S_STATUS
0	OK	0
1	PIF not running	1
2	No channel active	1
3	Channel A not active	0
4	Channel B not active	0

Table 3-45: Error codes for LINE object

Error Code (S_XDESCRIPTION)	Meaning	S_STATUS
0	OK	0
1	Communication disturbed	1

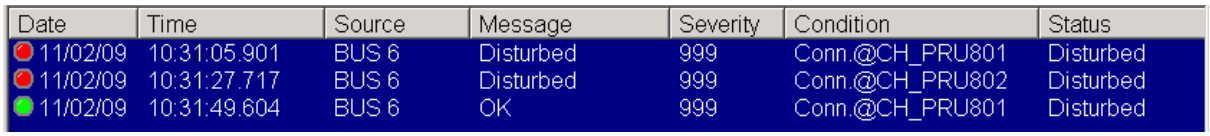
Table 3-46: Error codes for STATION object

Error Code (S_XDESCRIPTION)	Meaning	S_STATUS
0	OK	0
1	Station not reachable	1
2	Station has disturbance	1
3	Disturbance word invalid	1
4	Not monitored	254

3.7.5.2 System Alarms

3.7.5.2.1 System Alarms for Bus and Line

Communication failures to an intraplant bus or serial line are reported as alarms with event category System Event.



Date	Time	Source	Message	Severity	Condition	Status
11/02/09	10:31:05.901	BUS 6	Disturbed	999	Conn.@CH_PRU801	Disturbed
11/02/09	10:31:27.717	BUS 6	Disturbed	999	Conn.@CH_PRU802	Disturbed
11/02/09	10:31:49.604	BUS 6	OK	999	Conn.@CH_PRU801	Disturbed

Figure 3-49: Example of bus alarms in an OPC alarm & event client

3.8 Redundancy Support

3.8.1 Acknowledge Synchronization

OPC Alarm&Event Servers maintain a list of active unacknowledged alarms. In configurations with redundant OPC Server, a mechanism must be provided to keep the acknowledge states in both server's lists the same.
If the client application in a redundant configuration does send an acknowledge signal only to one server, the exchange of acknowledge information must take place between the OPC Servers.
The exchange of acknowledge information can be activated by defining corresponding partner servers.

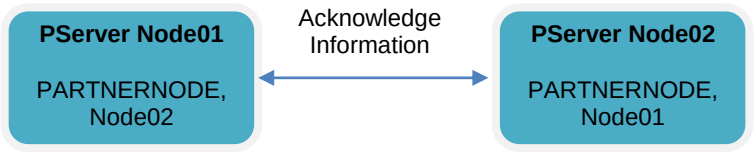


Figure 3-50: Exchange of Acknowledge Information between Partner Nodes

How to define a Partner Node is described in 3.3.3.4.9 PARTNERNODE[X] Instruction.

3.8.2 Synchronization of Event Suppression

Via the partner node connection, the event suppression configuration is synchronized.

3.8.3 Propagation of Node-Specific Partner Events.

Certain event types are node-specific, i.e. can concern only the OPC server on one of the redundant nodes. These node-specific events are

- Command tracking messages
- P13 system events.

To provide these event messages to a client connected to the partner node, these types of events are reported to clients also by the partner node. The event messages received from partner node are indicated by a “>” character behind the node.

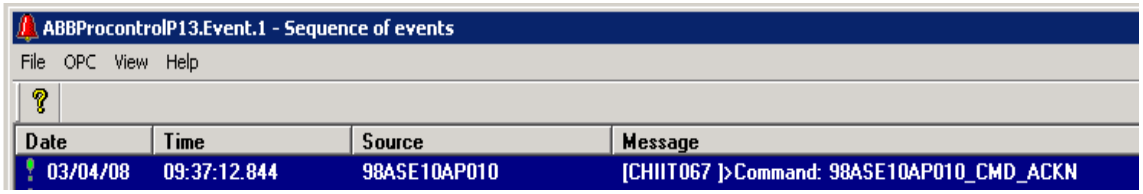

ABBProcontrolP13.Event.1 - Sequence of events
File OPC View Help
Date Time Source Message
03/04/08 09:37:12.844 98ASE10AP010 [CHIIT067]>Command: 98ASE10AP010_CMD_ACKN

Figure 3-51: Example of a Message received from PartnerNode CHIIT067

3.8.4 Bus Connection Controlled Redundancy Switch-Over

A pair of redundant PServers can cause an appropriate redundancy switch-over based on the state of their bus connection states. The two redundant PServers cyclically read the number of active bus connections from its partner. If a PServer recognizes its own number of active busses as less than that of its partner (i.e. its connection state is worse than that of the partner), it sets itself to state OPC_STATUS_COMM_FAULT. This state can be used by the client (e.g. 800xA PPA) to do a switch-over to the better node. The PServer in OPC_STATUS_COMM_FAULT state sets itself to running state when it recognizes its number of active bus connections as equal or bigger compared to that of the partner.
To activate bus connection controlled redundancy switch-over, the extended partner node connection (PARTNERNODEX, see *3.3.3.4.9 PARTNERNODE[X] Instruction.)* must be used.
The following extract of an event log illustrates the messages caused by redundancy bus connection monitoring.

```
13:38:16.83 [CH_PRU801 ]>  Info  : OPC server set to running (Active buses: Me, Partner): 1,  1
13:38:16.00 [CH_PRU801 ]>  Info  : PIF: Channel A operative,  Bus. No.  : 6,  0
13:38:08.83 [CH_PRU801]    Info  : OPC server suspended in favor to partner (Active buses: Me, Partner): 0,  1
13:38:08.00 [CH_PRU801]    Info  : PIF: Channel AB not operative, No bus connected ,Bus No.  : 6,  0
```

Figure 3-52: Redundancy Bus Connection Monitoring Messages

3.9 VPC Mode “Individual Command Signals”

3.9.1 Concept

In the VPC Mode “Individual Command Signals”, an individual command signal for each command and each control object is used. Additionally a global release signal common to all control objects is necessary to enable the execution of the command.
Specific handling is used for acknowledge of a control object. The individual acknowledge signal must be paired the global acknowledge.

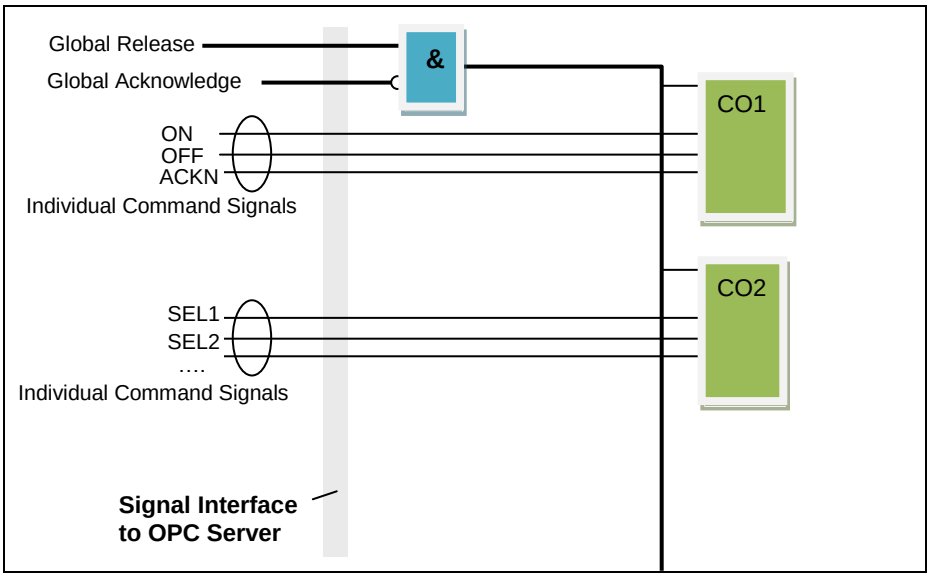


Figure 3-53: Signal handling for VPC mode "Individual Command Signals

Special care has been taken to avoid mutual disturbances or wrong commands in case of parallel operation of different control objects:

- Because the individual acknowledge signal is in reality one of the "normal" commands (e.g. ON, OFF), the release signal has to be locked to 0 during an acknowledge command to prevent unwanted execution of a command. This locking is done in Procontrol P13.
- The 1-state of global acknowledge signal must cover the whole span of the individual acknowledge signal. This means, that the global acknowledge must be set before the individual one and must have a slightly longer duration.
- Global Release and Global Acknowledge must be "reference-counted", i.e. they should only be reset, if no more corresponding active commands exist.

The following types of control objects are supported:

Table 3-47: Object types supported by VPC mode "Individual Command signals"

Procontrol Naming	As160OS Naming
ASE	DCTS
ASS	DCS
ASM	DCSV
SWV	SPI
GSA	GRC
VW2	SEL2
VW3	SEL3
VW4	SEL4

3.9.2 Engineering

3.9.2.1 Selecting VPC Mode "Individual Command Signals"

This selection has to be done via PServer User Interface General->VPC Modes. See Figure 3-16: Property Page for VPC Mode Configuration.

3.9.2.2 Identifying Global Command Signals

The global command signals are identified by the corresponding parameter set records in the pve-file. The global signals (Release, Acknowledge) are specific to the bus number.

- For the global release signal :
  VPCDEF1,**REL**,<RelSigBus 0>,<RelSigBus 1>,…

- For the global acknowledge signal :
  VPCDEF1,**ACKN**,<AcknSigBus 0>,<AcknSigBus 1>,…

If the global signals are the same for all busses, the configuration must look as follows:

- Global signals valid for all busses :
  VPCDEF1,REL,<RelSig AllBusses>,*
  VPCDEF1,ACKN,<AcknSig AllBusses>,*

3.9.2.3 Identifying Individual Command Signals

The individual command signals are identified by a corresponding naming convention:
<Control Object Name>_<Command Signal Code>
The command signal codes are dependant from the control object type. They can be defined by corresponding parameter set records in the pve-file as shown in the following list:

- **VPCDEF1**,**ASE**,<ACKN>,<ON>,<OFF>
  (AS160OS: DCTS)
- **VPCDEF1**,**ASS**,<ACKN>,<OPEN>,<CLOSE>,<HOLD>
  (AS160OS: DCS)
- **VPCDEF1**,**ASM**,<ACKN>,<ON>,<OFF>
  (AS160OS: DCSV)
- **VPCDEF1**,**SWV**,<ACKN>,<RAISE>,<LOWER>
  (AS160OS: SPI)
- **VPCDEF1**,**GSA**,<ACKN>,<ON>,<OFF>,<HOLD>
  (AS160OS: GRC)
- **VPCDEF1**,**VW2**,<ACKN>,<SEL1>,<SEL2>
  (AS160OS: SEL2)
- **VPCDEF1**,**VW3**,<ACKN>,<SEL1>,<SEL2>,<SEL3>
  (AS160OS: SEL3)
- **VPCDEF1**,**VW4**,<ACKN>,<SEL1>,<SEL2>,<SEL3>,<SEL4>

(AS160OS: SEL4)
<…> defines the signal code for the corresponding command.

3.9.2.4 Special Parameters

- With the VPCDEF1, DELAY1 instruction, the additional length in milliseconds of the global acknowledge signal can be defined. Default value is 50 ms.

  Example:
  VPCDEF1, DELAY1, 60

- With the MSGFILTER instruction, warnings in the message log can be suppressed. This can be useful, to suppress warnings for regularly missing commands after commissioning.

  Example:
  MSGFILTER, 1

This instruction suppresses warnings.

3.10 VPC Mode “Mixed Mode I”

3.10.1 Concept

The VPC Mode “Mixed Mode I” is a mix of two VPC concepts. In this mode, analog control objects as ASP, HST etc. are operated via “Telegram and ID-Signals” concept. This means that these control objects use the XC13 telegram and one or two ID-Signals[35]. Binary control objects including group control objects are operated via the “Individual Command Signals” concept (see 3.9 VPC Mode “Individual Command Signals”).

3.10.2 Engineering

3.10.2.1 Select VPC Mode “Mixed Mode I”

This selection has to be done via PServer User Interface General->VPC Modes.

[35] In submode RMPI, ramping SWVs use „Individual Command Signals“ (see 3.10.2.4 VPC Submode “RMPI”)

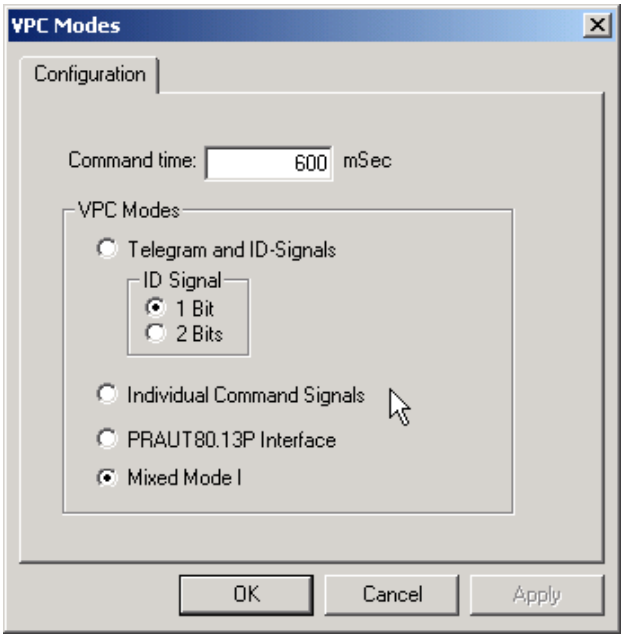


Figure 3-54: VPC Mode "Mixed Mode I" Configuration

3.10.2.2 Configure Analog Control (XC13) Part

- Select number of ID bits in dialog General->VPC Modes.
- Configure signal ID for ID bits with VPCID instruction in the pve-file (see *3.3.3.4.1 Parameter Set VPCID for ID-Signals Definition*).
- Configure existing command channels per bus. Set addresses for XC11 and XC12 to zero.
- Configure bit for acknowledge if not default.

3.10.2.3 Configure Binary Control Part

All configurations concerning the binary control part are done in the pve-file.

3.10.2.4 VPC Submode "RMPI"

In the VPC Submode "RMPI", SWV objects configured with subtype "RMP" ("Ramping") are operated via „Individual Command Signals".

The VPC Submode can be selected via the following instruction:
VPCDEF, SUBMODE, RMPI

The SWV command signals have to be configured.

3.10.2.5 Example pve-configuration

The following table shows a sample pve configuration for Mixed Mode I.

Table 3-48: Sample PVE-Configuration for Mixed Mode I

#Command signals for binary control	Type	ACKN	ON/ SEL1	OFF/ SEL2	STOP/ SEL3	SEL4	REL (ind.)
#Global Signals		Bus0	Bus1				
VPCDEF1	ACKN	10CKA21 GK001_ ACKN	*				

VPCDEF1	REL	10CKA21 GK001_ XS55	*				
#Command signal codes							
VPCDEF1	ASE	XB11	XB11	XB12			XM23
VPCDEF1	ASS	XB11	XB11	XB12	XB13		XM23
VPCDEF1	ASM	XB11	XB11	XB12			XM23
VPCDEF1	VW2	XA61	XA61	XB63			
VPCDEF1	GSA	XA11	XA11	XA12	XA15		
#Reset delay for global acknowledge (ms)							
VPCDEF1	DELAY1	100					
#Suppress warnings with missing command signals							
MSGFILTER	1						
#Definitions for analog control							
#Acknowledge bit is 8 (non default)							
VPCDEF	ACKNBIT	8					
#Signal code for ID bit							
VPCID	XS13						
#DMS signal code for all types							
DMSID	YS22						

3.11 Miscellaneous

3.11.1 RS232 Connection for BK06

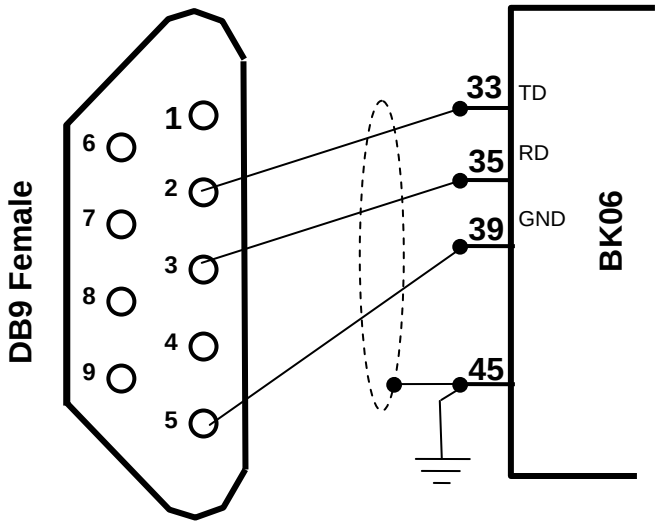


Figure 3-55: RS232 Connection for BK06

4. S+ P13 ENGINEERING WORK BOOK

4.1 Overview

The input interface for the S+ P13 tag database engineering is the S+ P13 Engineering Workbook. The S+ P13 Engineering Workbook is an Excel Workbook which can be imported to the S+ Operations tag database. The corresponding pve-file used by then Procontrol P13 Connect OPC Server can be generated by means of the S+ P13 OPC Builder.

The tag engineering dataflow implies that the parameters contained in the workbook are changed only in the S+ P13 Engineering Workbook and not in S+ Operations.

Preconditions for doing S+ P13 tag database engineering are:

- Be familiar with Procontrol P13, in particular concerning multifunctions.
- Be familiar with Procontrol P13 Connect OPC server configuration
- Be familiar with S+ Operations tag configuration

4.2 Basic Workbook Structure

The S+ P13 Engineering Workbook is the source for the S+ Operations tag database import and for generation of the P13 OPC server engineering file (.pve). It contains therefore the fields used by S+ Operations and/or by the Procontrol P13 Connect OPC Server.
In respect to readability, the engineering data is separated into three worksheets.

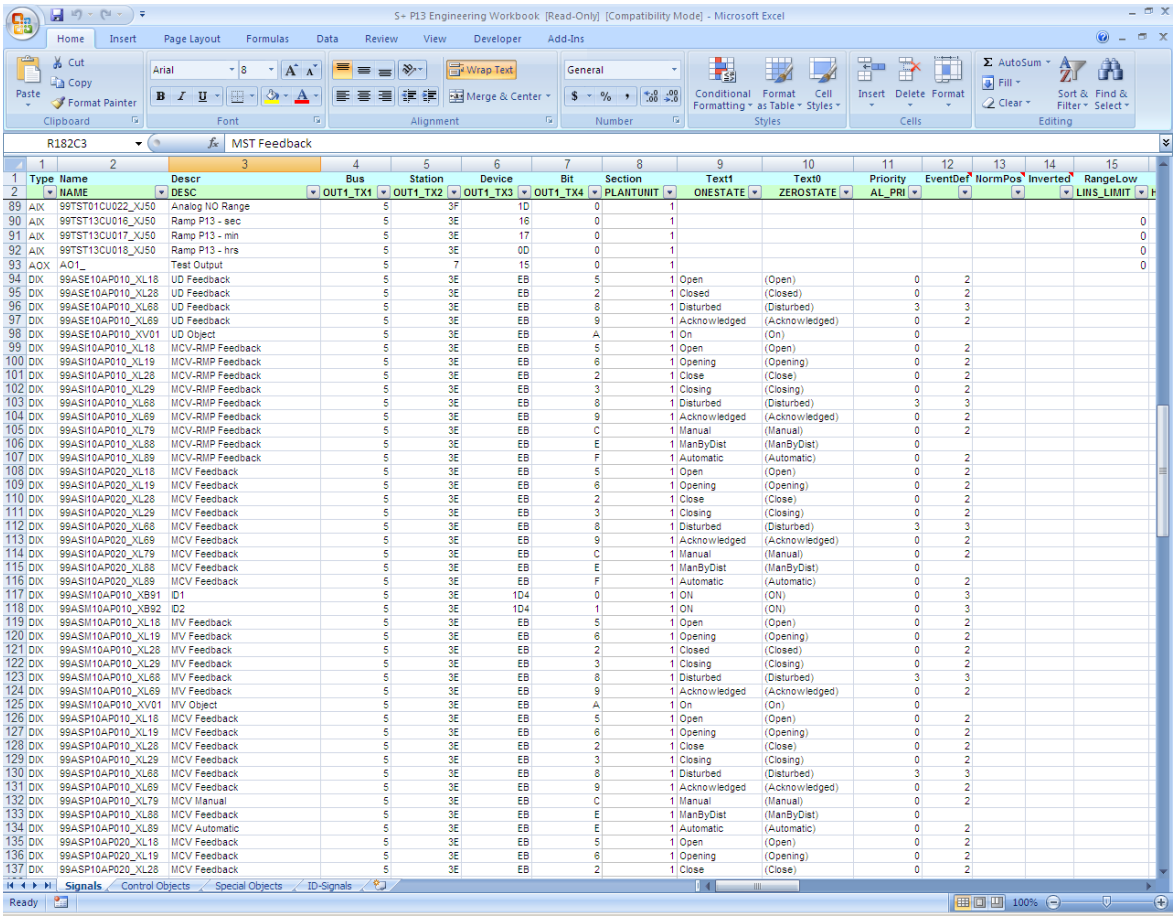


Figure 4-1: Worksheets in the S+ P13 Engineering Workbook

4.3 Column Headings – Field Names

Both, the S+ Operations tag import and the S+ P13 OPC Builder work with column headings to identify the columns and not with the column positions. The columns used and the field designations are different for the two utilities. Therefore two rows with column headings are provided.

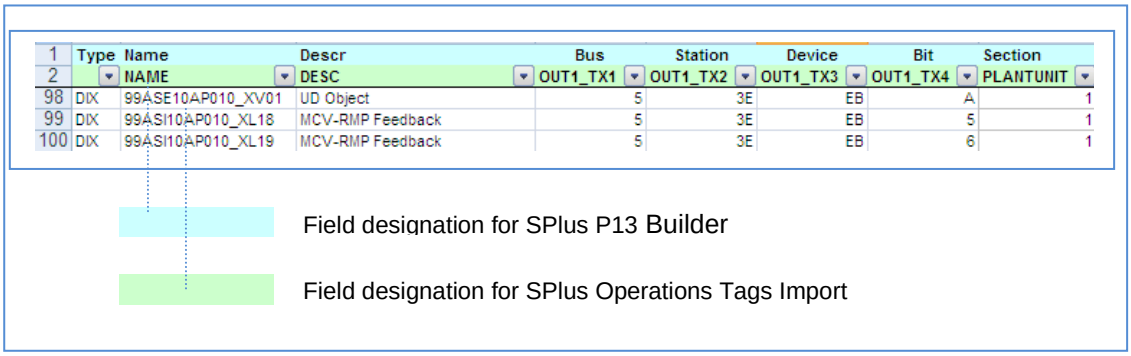

1 Type Name Descr Bus Station Device Bit Section
2 NAME DESC OUT1_TX1 OUT1_TX2 OUT1_TX3 OUT1_TX4 PLANTUNIT
98 DIX 99ASE10AP010_XV01 UD Object 5 3E EB A 1
99 DIX 99ASI10AP010_XL18 MCV-RMP Feedback 5 3E EB 5 1
100 DIX 99ASI10AP010_XL19 MCV-RMP Feedback 5 3E EB 6 1
Field designation for SPlus P13 Builder
Field designation for SPlus Operations Tags Import

Figure 4-2: Column Headings in the S+ P13 Workbook

4.4 Named Ranges in S+ P13 Engineering Workbook

Within the worksheets some named ranges have to be defined

Table 4-1: Named ranges in the S+ P13 Engineering Workbook

Worksheet	Named Range for S+ Opeations	Named Range for S+_P13 OPC Builder
Signals	Database	P13OPC_Signals
Control Objects	Database	P13OPC_ControlObjects
Special Objects	Database	Not used
ID-Signals	Not Used	P13OPC_IDSignals

The named ranges must include all columns used by the corresponding target (S+ Operations tag import or S+ P13 OPC Builder). The named ranges for the S+ Operations tag import must not include the heading row for the S+ P13 OPC Builder. The named ranges for the S+ P13 OPC Builder will contain the heading row for the S+ Operations tag import. This row will be ignored by the S+ P13 OPC Builder.

4.5 Signals Sheet

The Signals sheet contains analog and binary inputs and outputs. The fields are described in the following table.

Table 4-2: S+ P13 Engineering Workbook Fields for Signals

OPC Field	S+ Operations Field	DIX/DOX	AIX/AOX	Meaning	Value
Type	-	x	x	Tag type	{DIX,DOX,AIX,AOX}
Name	NAME	x	x	Tag name	Text
Descr	DESC	x	x	Tag description	Text
Bus	OUT1_TX1	x	x	Bus number	0,…,7
Station	OUT1_TX2	x	x	Station number	Hex, 00,..,3F
Device	OUT1_TX3	x	x	Device Number	Hex, 00,..,FF
Bit	OUT1_TX4	x	-	Bit Number	Hex, 0,…,F
Section	PLANTUNIT	x	x	Section	0,1,…
Text1	ONESTATE	x	-	Text for 1-state	Text
Text0	ZEROSTATE	x	-	Text for 0-state	Text
Priority	AL_PRI	x	-	Priority for alarm	1,…,4

EventDef	-	x	-	Event definition: 0: No message 1: Message if Normal->Active 2: Message if Active->Normal 3: Message both directions	0,…,3
NormPos	-	x	-	Which is normal (not active) state	{0,1}
Inverted	-	x	-	Field value to be inverted	{Y, N}
RangeLow	LINS_LIMT	-	x	Measuring range low	Float
RangeHigh	HINS_LIMT	-	x	Measuring range high	Float
Unit	EUDESC	-	x	Measuring unit	Text
NoDecs	NUMDECPL	-	x	No of decimal places	1,2…
DRLow	SCA_VAL_0	-	x	Display range low	Float
DRHigh	SCA_VL_100	-	x	Display range high	Float
LimValue1Lim Value2 LimValue3Lim Value4	L2ALARM L1ALARM H1ALARM H2ALARM		x	Limit <n> value	Float
LimType1 (...2,3,4)	-		x	Limit <n> type	0: Upper 1: Lower
LimTreat1 (...2,3,4)	-		x	Limit <n> treatment (see EventDef field)	0,…,3
LimPrio1 LimPrio2 LimPrio3 LimPrio4	ALPRI_2L ALPRI_1L ALPRI_1H ALPRI_2H		x	Limit <n> priority	0,4: Status 1,2,3: Alarm
AlarmText1(… 2,3,4)	-		x	Limit <n> alarm text	Text
SpecProc	-	(x)	(x)	Special processing identifier[36]	Text
Output	-	DOX	AOX	Output the value	{Y, N}
-	FIELD_AD1	x	x	Refresh Time	500
-	FIELD_AD2	x	x	Read type	120 (By exception)
-	TAGTYPE	x	x	S+ Operations tag type	{Analog, Digital}
-	TAGSRC	x	x	Data source for S+ Opeations	PROP13
-	OPCEXPCLNT	x	x	Allow output (commands) to OPC server	Y
-	ALMGROUP	x	x	Alarm group	0, 1…
-	ALMREM	x	x	Remote alarm processing	Y
-	FIELD_TX1	x	x	OPC DA server	ABBProcontrolP13.OPC.1
-	FIELD_TX3	x	x	OPC DA item name	= Name
-	FIELD_TX5	x	x	OPC AE server	ABBProcontrolP13.Event.1
-	FIELD_TX7	x	x	OPC AE source item name	= Name
-	DATA_PROC	x	x	S+ Operations Data Processor	PROP13.Block.P13.<type> e.g. PROP13.Block.P13.AIX
	FACEPLATE	x	x	Faceplate	Prctrl.POP_P13<type> e.g. Prctrl.POP_P13AIX

[36] See Table 4-3:Available Special Processing for Signals

The following table shows applicable special processing. Consult also the Procontrol P13 Connect OPC Server part of the manual [PROCONTROL P13 OPC SERVER**Error! Reference source not found.**].

Table 4-3:Available Special Processing for Signals

Identifier	Meaning	AIX	DOX
UBCD1	Data word is interpreted as unsigned BCD coded	x	
UBCD8L	Left byte of data word is interpreted as unsigned BCD coded	x	
UBCD8H	Right byte of data word is interpreted as unsigned BCD coded	x	
UKSU	Adapt range for KSU connection	x	
UNOSTB	Handle bit 0 as normal value bit and not as sensor disturbance bit	x	
CMD	Command pulse output		x

4.6 Control Objects Sheet

The Control Objects sheet contains all objects which implement a process control function. The fields are described in the following table.

Table 4-4: S+ P13 Engineering Workbook- Fields for Control Objects

OPC Field	S+ Operations Field	Meaning	Value
Type	-	Tag type	ASEX,ASMX,ASSX,VW2X, VW3X,VW4X,HSTX,SWVX ,ASIX;ASPX,GSAX
Name	NAME	Tag name	Tag name
Descr	DESC	Tag description	Text
Section	PLANTUNIT	Section	1…
Operable	-	Is foreseen for operation	{Y,N}
Subtype	OUT2_TX9	See *4.6.2 Subtypes*	Tag name
XL68	OUT1_TX9	See *4.6.1 Feedback Signals*	Tag name
XL69	OUT1_TX10	See *4.6.1 Feedback Signals*	Tag name
XL18	OUT1_TX1	See *4.6.1 Feedback Signals*	Tag name
XL28	OUT1_TX3	See *4.6.1 Feedback Signals*	Tag name
XL19	OUT1_TX2	See *4.6.1 Feedback Signals*	Tag name
XL29	OUT1_TX4	See *4.6.1 Feedback Signals*	Tag name
XL38	OUT1_TX5	See *4.6.1 Feedback Signals*	Tag name
XL39	OUT1_TX6	See *4.6.1 Feedback Signals*	Tag name
XL58	OUT1_TX7	See *4.6.1 Feedback Signals*	Tag name
XL59	OUT1_TX8	See *4.6.1 Feedback Signals*	Tag name
XL78	OUT2_TX1	See *4.6.1 Feedback Signals*	Tag name
XL79	OUT2_TX2	See *4.6.1 Feedback Signals*	Tag name
XL88	OUT2_TX3	See *4.6.1 Feedback Signals*	Tag name
XL89	OUT2_TX4	See *4.6.1 Feedback Signals*	Tag name
SP	OUT2_TX5	See *4.6.1 Feedback Signals*	Tag name
CV	OUT2_TX6	See *4.6.1 Feedback Signals*	Tag name
AV	OUT2_TX7	See *4.6.1 Feedback Signals*	Tag name
ActStep	OUT2_TX8	See *4.6.1 Feedback Signals*	Tag name
RELON	-	Name of the release on signal	Tag name
RELOFF	-	Name of the release off signal	Tag name
PROTON	-	Name of the protection on signal	Tag name
PROTOFF	-	Name of the protection off signal	Tag name
-	FIELD_AD1	Refresh time in milliseconds	200
-	FIELD_AD2	ReadType (By exception)	120
-	OPCEXPCLNT	Allow command to OPC	Y

-	TAGTYPE	S+ Operation stag type	DIGITAL
-	TAGSRC	Data source for S+ Operations	PROP13
-	ALMGROUP	Alarm group for alarm display	0, 1…
-	ALMREM	Remote alarm processing	N
-	FIELD_TX1	OPC DA server	ABBProcontrolP13.OPC.1
-	FIELD_TX3	OPC DA item name	= <Object Name>
	FIELD_TX1	OPC AE server	ABBProcontrolP13.Event.1
	FIELD_TX3	OPC AE item name	= <Object Name>
-	DATA_PROC	S+ Operations Data Processor	PROP13.Block.P13.<type> e.g. PROP13.Block.P13.ASSX
	FACEPLATE	Faceplate	Prctrl.POP_<FaceplateName> e.g. Prctrl.POP_P13BINC

4.6.1 Feedback Signals

Control objects have various digital status signals associated which represent the state of the control object. The meaning of these feedback signals depends of the type of the control objects. Consult the corresponding Procontrol P13 documentation.
Analog control objects have associated analog signals, e.g. setpoint, actual position).
If the name of a feedback signal begins with an ampersand ('&'), the ampersand is replaced by the name of the control object.
Feedback signals have to be defined in the Signals sheet of the S+ P13 Engineering Work book.

4.6.2 Subtypes

Table 4-5: Common Subtypes for Analog Control

Subtype	ASS	Analog Control	Meaning
TIP	x		Inching mode
SET		x	Allows also value entry for the setpoint (besides Raise/Lower operation)
RMP		x	Default – Raise/Lower operation only

4.7 ID-Signals Sheet

ID-Signals are only used by the Procontrol P13 Connect OPC server for command output. ID-Signals are not loaded to S+ Operations. The fields are described in the following table.

Table 4-6: S+ P13 Engineering Workbook- Fields for ID-Signals

OPC Field	Meaning	Value
Type	Tag type	DO
Name	Tag name	String
Descr	Tag description	String
Bus	Bus number	0,…,7
Station	Station number	Hex, 00,..,3F
Device	Device Number	Hex, 00,..,FF
Bit	Bit Number	Hex, 0,…,F
Section	Section	0,,…
Text1	Text for 1-state	Text
Text0	Text for 0-state	Text
Priority	Priority for alarm	1,…,4
EventDef	Event definition: 0: No message 1: Message if Normal->Active 2: Message if Active->Normal 3: Message both directions	0,…,3
NormPos	Which is normal (not active) state	{0,1}
Inverted	Field value to be inverted	{Y, N}
Output	Output the value	{Y, N}

4.8 Special Objects Sheet

The following special objects are configured in this sheet:

Table 4-7: S+ P13 Engineering Workbook –Special Objects Sheet

Special Object Type	Object Name	Meaning	required
P13CON	P13 Connectivity	Serves in S+ Operations as target object for P13 system messages.	yes
Bus	Bus <Bus Number> e.g. : Bus 5[37]	Provides data items for bus status.	optional
Station	<BusAddr>-STN<StationAddr> e.g. : 5-STN3E[38]	Provides data items for station status.[39]	optional

The fields are described in the following table.

Table 4-8: S+ P13 Engineering Workbook- Fields for Special Objects

Field	Object Type		
	P13CON	BUS	STATION
NAME	e.g. P13 Connectivity	e.g. BUS 5	e.g. 5-STN3E
DESC	Procontrol P13 Connectivity Server	Bus 5	Station 3E on Bus 5

[37] Name must follow this pattern.
[38] Name must follow this pattern.
[39] Station monitoring must be available in the Plant and configured correctly in the OPC server.

PLANTUNIT	1...		
ALMGROUP	0, 1…		
FIELD_AD1	200		
FIELD_AD2	120		
TAGTYPE	ANALOG	ANALOG	DIGITAL
TAGSRC	PROP13		
AL_REM	Y		
FIELD_TX1	ABBProcontrolP13.OPC.1		
FIELD_TX3	PServerAdmin	BUS 5	5-STN3E
FIELD_TX5	ABBProcontrolP13.Event.1		-
FIELD_TX7	System	BUS 5	-
DATA_PROC	PROP13.Block.P13. P13CON	PROP13.Block.P13.BUS	PROP13.Block.P13. STATION

4.9 S+ P13 Tag Engineering Workflow

4.10 OPC Server Configuration

The Procontrol P13 Connect OPC Server configuration has to be entered according to the Procontrol P13 OPC server manual *[3.3.3* Process Variables Engineering File*]*. This includes in particular buses, command channels and the pve-file name.
It is a good practice to use “hierarchical” pve-files by means of the APPEND instruction.

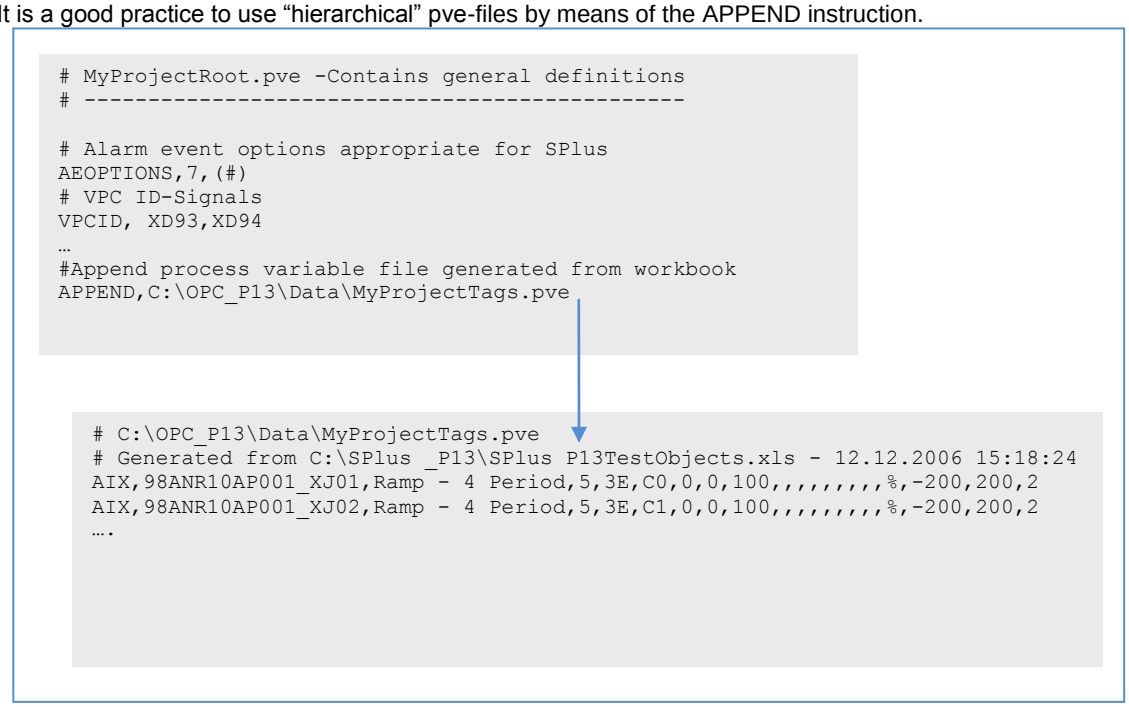


Figure 4-3: Illustration of “hierarchical” PVE-Files

5. S+ P13 OPC BUILDER

The S+ P13 OPC Builder extracts the data needed for the Procontrol P13 OPC server from the S+ P13 Engineering workbook and creates the corresponding pve-file to be loaded by the OPC server.

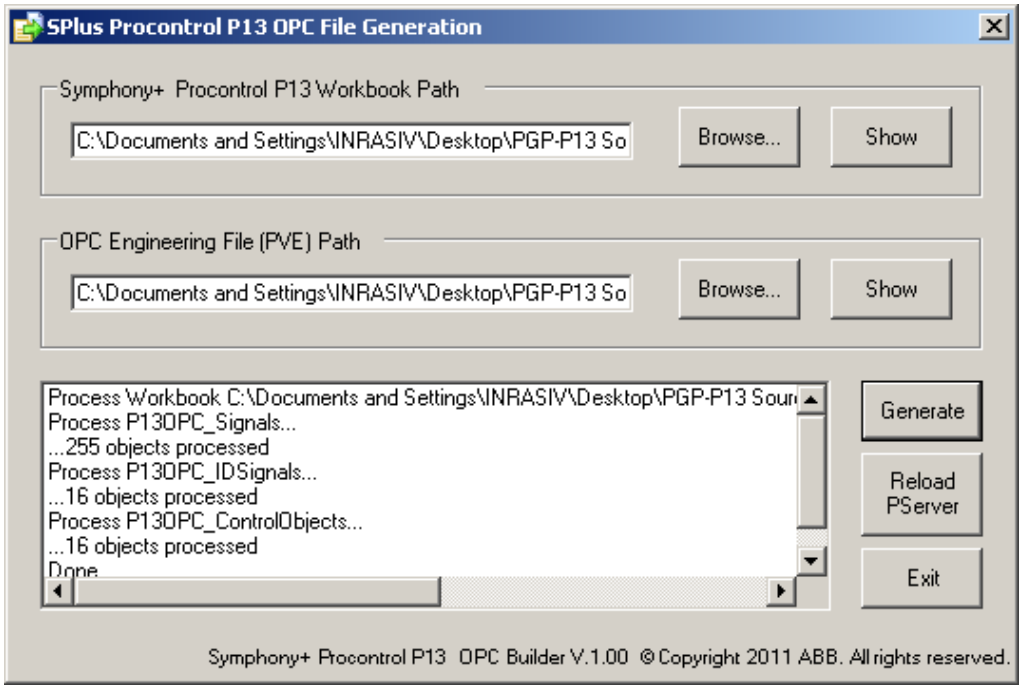


Figure 5-1: User Interface of S+ P13 OPC Builders

Select the paths for the S+ P13 Engineering Workbook and the target OPC Engineering File. Then generate the pve-file.

Note
The S+ P13 OPC Builder should be started from a local drive. If started from a network drive it has by default too less file system access permissions (“partially trusted”).

5.1 Procedure for Engineering Data Loading

Table 5-1: Procedure for Engineering Data Loading

Action		Remark
Check S+ P13 Engineering Workbook		
	Named ranges	
	Fields and Data	
Update P13 OPC Server		
	Generate pve-File with S+ P13 OPC Builder	
	Restart the P13 OPC Server	
	Check OPC Server log file	
Update S+ Operations Tag Database		
	Import sheet Signals (if changed) and sheet Control Objects (if changed) with S+ Operations tag database builder, (See *Figure 5-2: Import Setting for Update of the S+ Tag* Database)	The sheet to be imported must be moved to the first sheet position in the workbook.
	Restart S+ Opeations	

The following picture shows the settings for S+ Operations tag database update import.

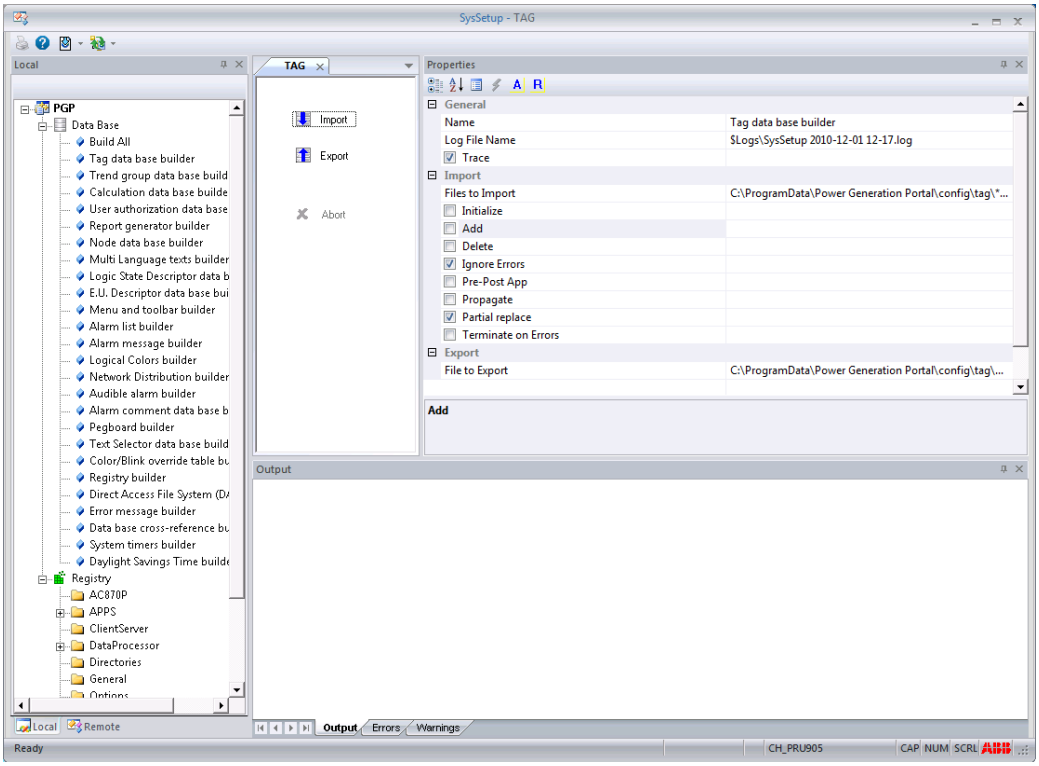


Figure 5-2: Import Setting for Update of the S+ Tag Database

5.2 S+ Operations P13 Connect OPC Communication Diagnostic

In order to have redundancy changeover on OPC communication failure between SPlus Operations and ABB Procontrol P13 OPC Server, It's necessary to create OPC Connection diagnostic tag SPlus Operations level.

5.3 OPC Diagnostic Tag

To add OPC Communication diagnostic tag, Open windows registry and locate Computer > HKEY_LOCAL_MACHINE > SOFTWARE > ABB Symphony Plus > Operations > APPS > OPC > OPCInstance001 > Tagname (String Value) and provide any valid Tagname. E.g. S2P13POC.

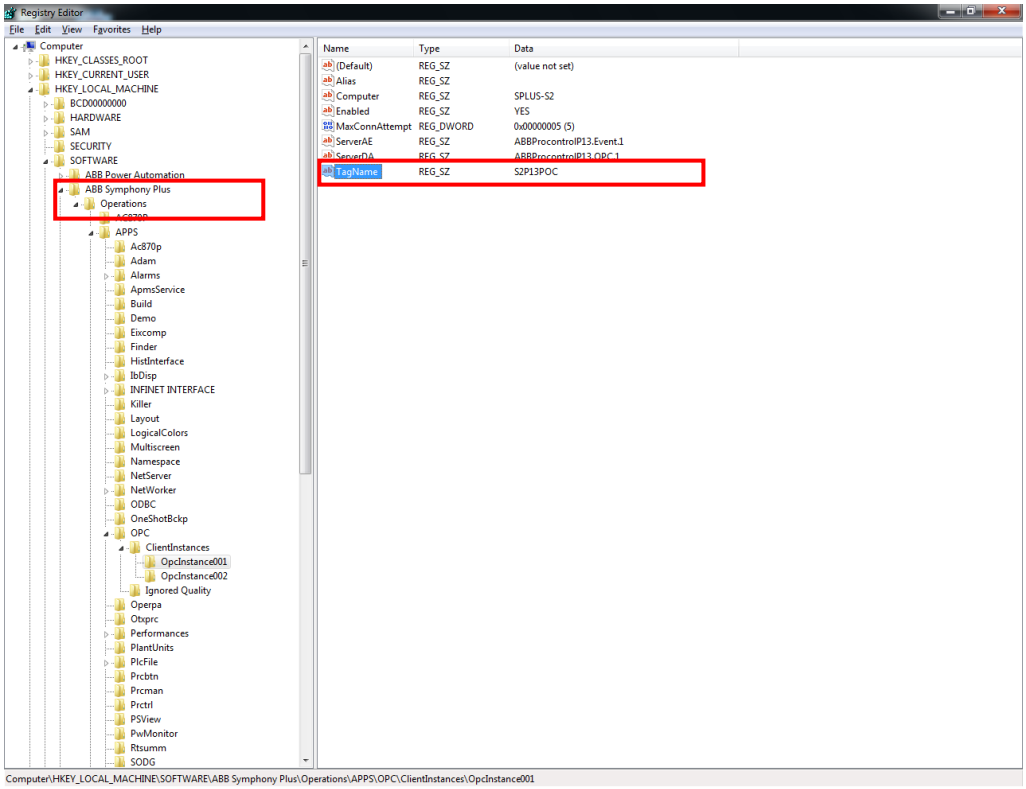


Figure 5-3: Adding OPC Diagnostic Tag in Windows Registry

If the defined “E.g:S2P13POC” tag name is not already present in SPlus Operations database, you’re able to configure it later in SPlus Operations without stopping the OPC Client. Note that such tag has to be of type “ExtDig” and “Ext” as follows:

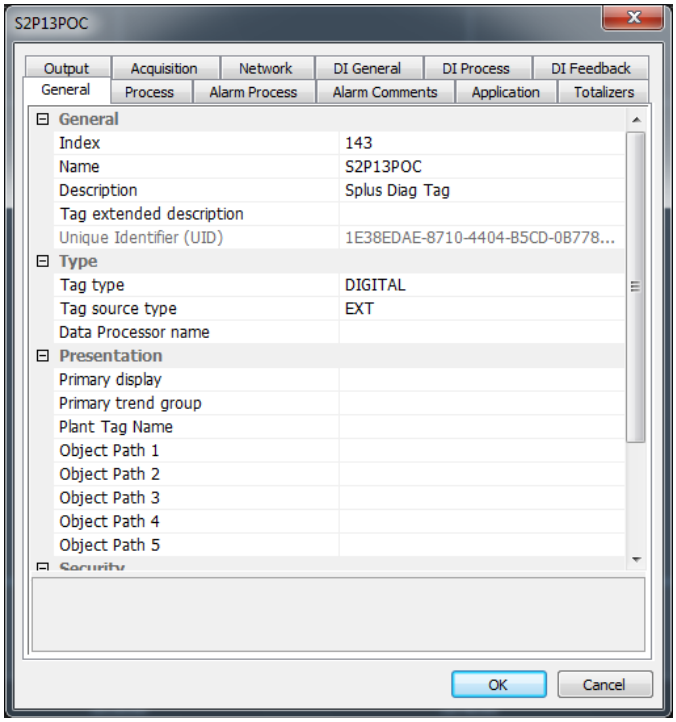


Figure 5-4: Adding OPC Diagnostic Tag in Windows Registry

The following are the diagnostic tag values associated to the communication states.

Table 5-2: Diagnostic tag values for OPC DA client Connection

State	Diagnostic Tag Value
Undefined	0
Stopped	1
Running	2
Standby	3
Connecting	4
MappingItems	5
NotConnected	6
Disabled	7
ServerNotRunning	8
WaitForConnection	9
NoResponse	10

As shown below, Configure the different alarm states using DI General Tab in the Tag Configuration of added OPC Diagnostic Tag.

Since Different Alarm States being created at SPlus Operations, It must keep the Remote Alarm Processing as “NO”.

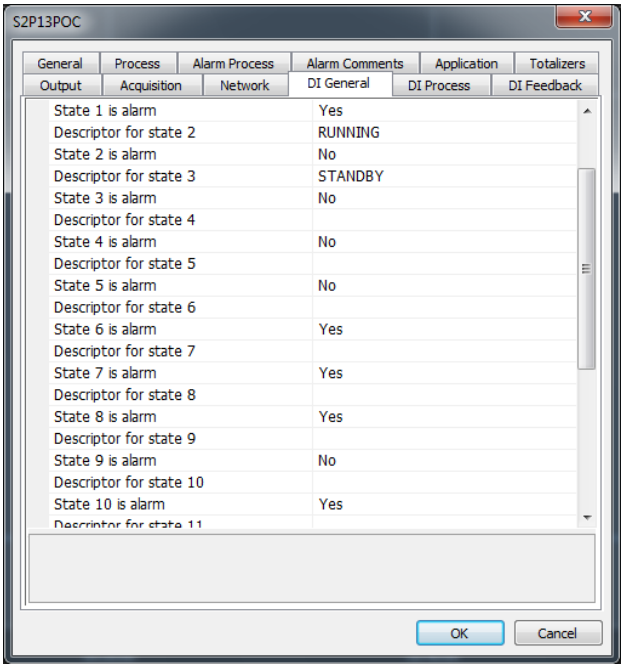


Figure 5-5: Configuring Different Alarm States for OPC Diagnostic Tag

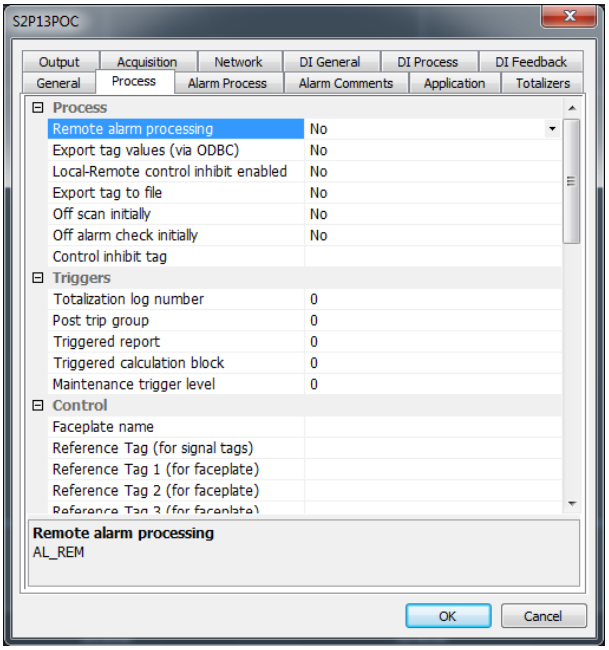


Figure 5-6: Configuring AL_REM flag

In order to shutdown the SPlus Operations during OPC Communication failure, Configure the Task monitor as shown below:

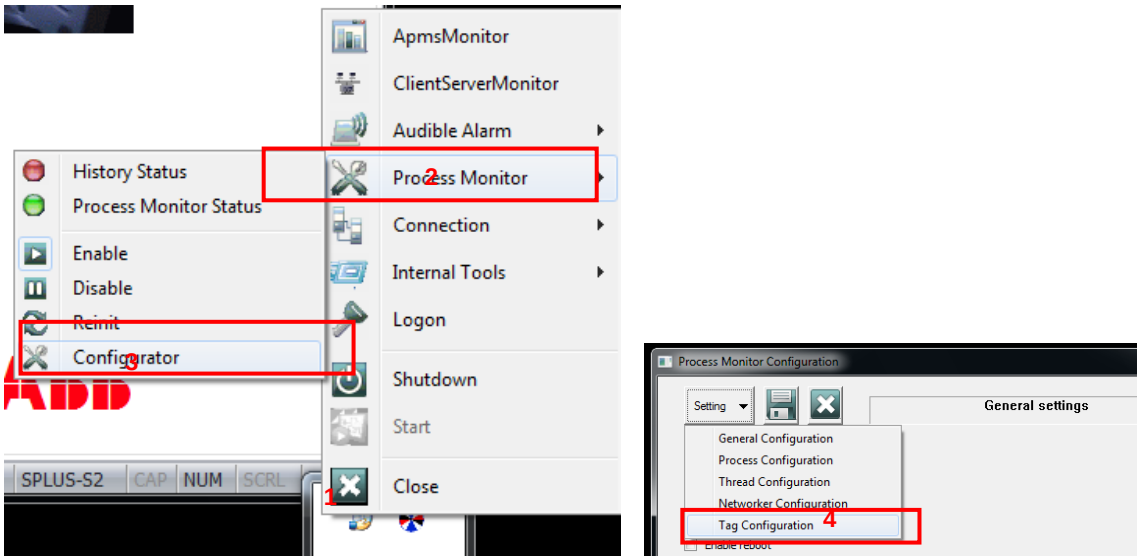


Figure 5-7: Process Monitor

- In System Tray, Right on PWMONITOR and Select Process Monitor > Configurator. Click on Settings and Select Tag Configuration from drop down menu.
- In the Process Monitor Configuration add OPC Diagnostic Tag under Alarmed Tags to Monitor. Click on the Settings and Go to General Configuration to check “Enable Restart” Flag. Then Save and Close.

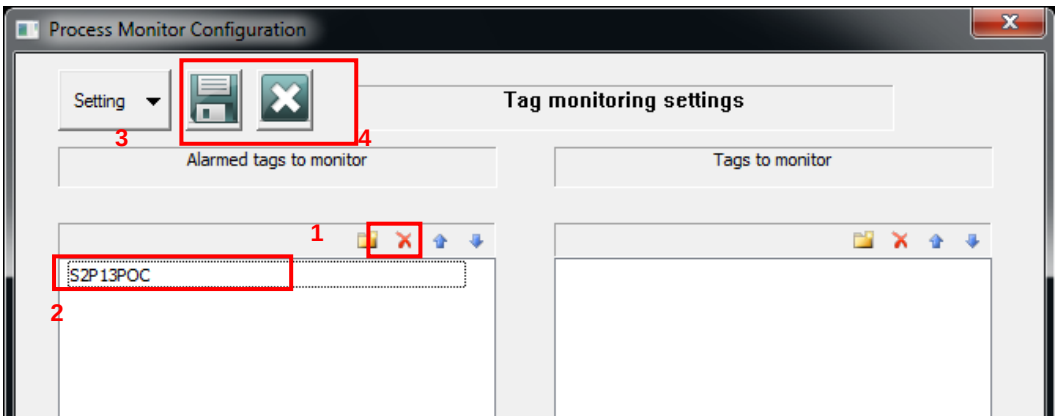


Figure 5-8: Adding OPC Diagnostic Tag in the Process Monitor

After configuring OPC Diagnostic Tag in the Process Monitor, whenever OPC communication fails between S+ Operations and Procontrol P13 OPC Server, SPlus will be stopped.

6. S+ P13 OBJECT REFERENCE

6.1 Product Overview

The S+ Operations P13 Connect Object Types provide the necessary S+ Operations object types to use S+ Operations functions for process operation and monitoring of Procontrol P13 plants. In particular, the S+ Operations P13 Connect Objects Types provide the graphical components like faceplates.

6.2 General

6.3 Colors

The colors used in faceplates are defined with named logical colors. The colors are defined in corresponding color tables provided by the standard S+ Operations Display Builder.

6.4 Faceplates

6.4.1 General Structure

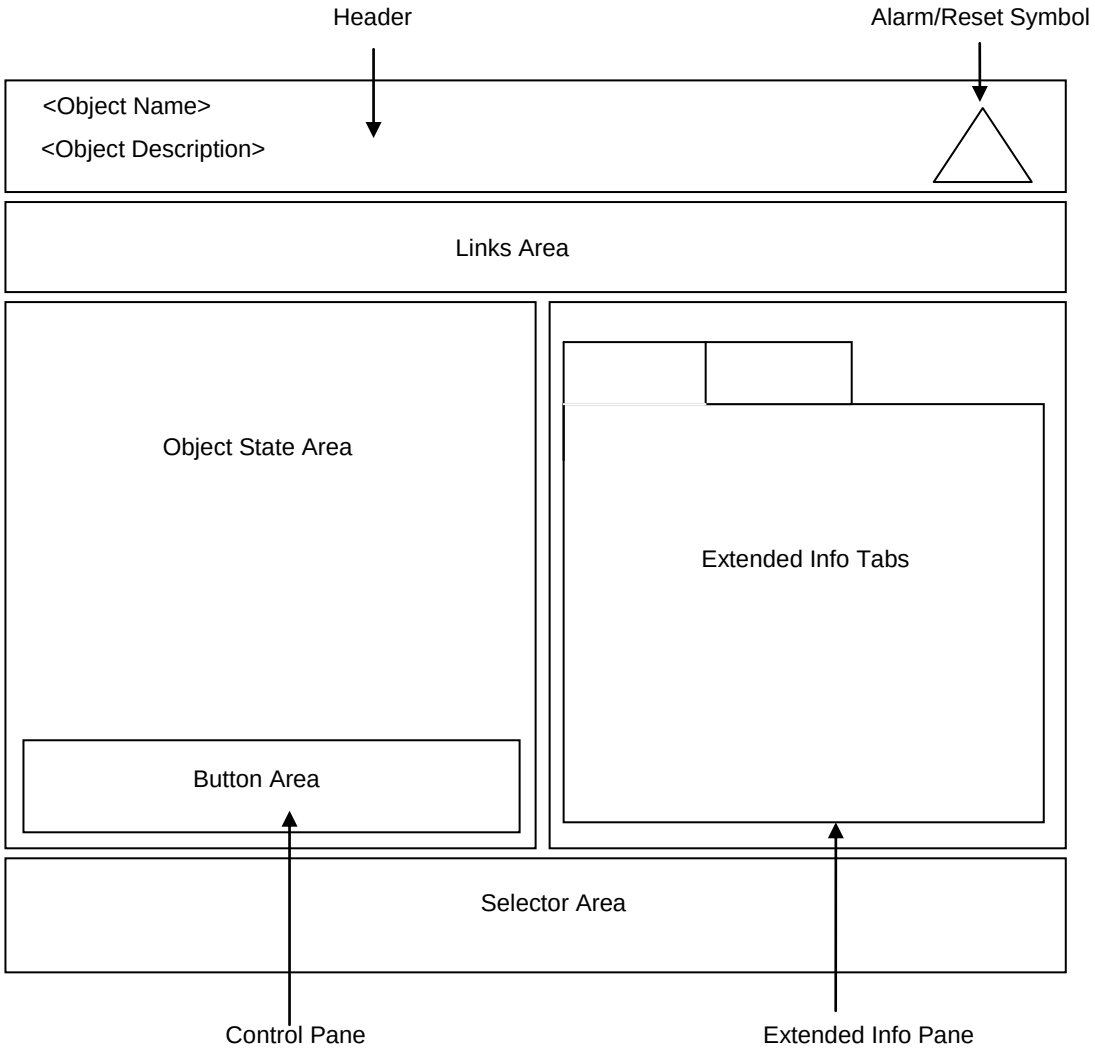


Figure 6-1Faceplate General Structure

Table 6-1: S+ P13 Faceplate General Structure

Faceplate Scope	Header	Link Area	Control Pane	Extended Info Pane	Selector Area
Normal	X	X	X		X

Extended	X	X	X	X	X

6.4.2 Alarm Symbol

6.4.3 Control Object

State	Presentation
Signal Error, Unacknowledged	
Channel Failure, Unacknowledged	
Fault, Unacknowledged	
Fault, Acknowledged	
Alarm gone, Unacknowledged	
No Alarm, (Alarm Gone Acknowledged)	
Signals	
Control Object	Reset Button

6.4.4 Links Area

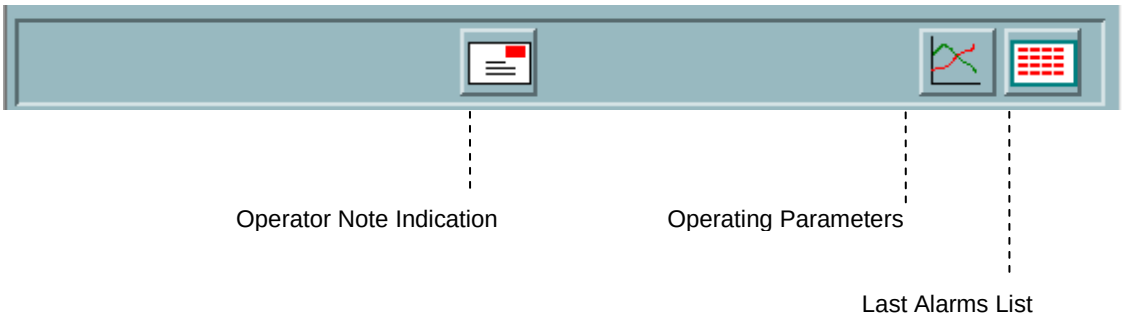


Figure 6-2: Faceplate Links Area

6.4.5 Object State Area

In the Object State Area, an object state symbol and additional information on the object state is provided.

6.4.6 Button Area

The button area provides the button to send commands to an object; Issue a command needs a two-step operation. First, the command selection button for the desired command has to be pressed. To send the command to the object, the OK/Return button has to be pressed.

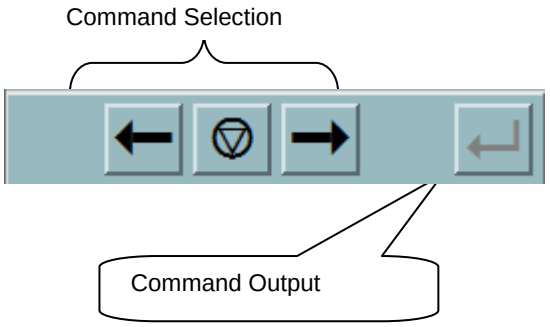


Figure 6-3: Faceplate Command Area

6.4.7 Selector Area

With the selector buttons, the faceplate's level for details can be selected

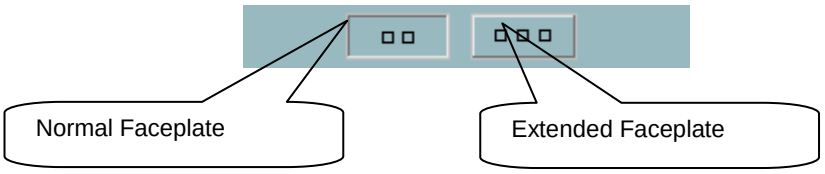


Figure 6-4: Faceplate Selector Area

6.5 Display Elements

6.5.1 General

Display elements represent objects within graphics. The set of different display elements provided depends on the object type. Display elements for control objects have a layout as shown in the following figure.

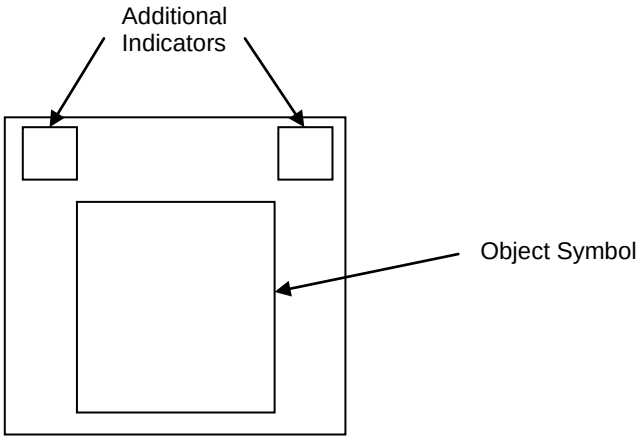


Figure 6-5: Layout of Display Elements for Control Objects

Table 6-2: State of Additional Indicators

State of Additional Indicators		Indication
Right		
	Operator Note exist for this object	

Left		
	Manual	

6.6 Object Types

6.7 Binary Signals

6.7.1 Faceplates

6.7.1.1 General Structure

For Binary signals provided with two tabs Parameters, Trend respectively.

Figure 6-6: Binary Signal Faceplate

6.7.1.2 Status Indication

Table 6-3: State of Status Indication(Faceplate)

Priority	State - 1	State - 0
0		
1		
2		
3		

4		
Error		

6.7.1.3 Parameters Tab

Parameters show the Procontrol P13 Address of the signal

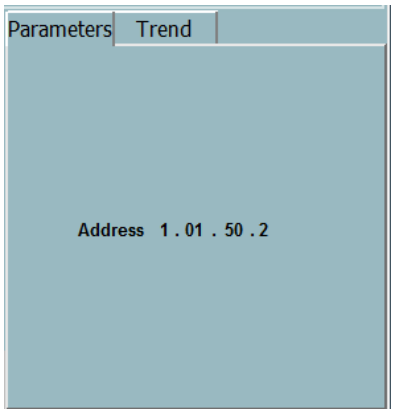


Figure 6-7: Binary Signal – Parameters Tab

6.7.1.4 Trend Tab

Trend Tab shows the Procontrol P13 value of the signal in trend form.

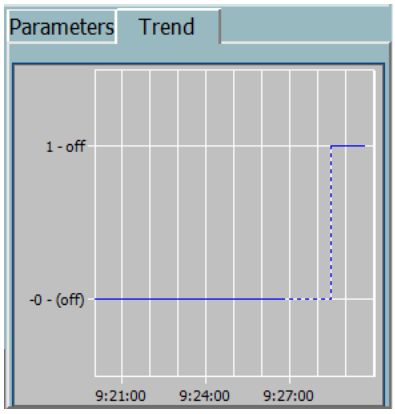


Figure 6-8: Binary Signal – Trend Tab

6.7.2 Display Elements

6.7.2.1 Display Elements *LED*

The LED element shows the value of a binary signal as colored shape. Optionally a text can be inserted into the element. For status (Priority 0) signals, alarm and normal colors can be configured.

Table 6-4: Color Mapping for LED Display Element

State	Error	Active Acknowledged	Acknowledged	Inactive Acknowledged	Acknowledged
Status (Priority 0)		Not applicable		Not applicable	
Alarm Priority 1		Flashing		Flashing	
Alarm Priority 2		Flashing		Flashing	
Alarm Priority 3		Flashing		Flashing	

Table 6-5: Input Properties for Display Element LED

Property	Meaning	Value	Default
Shape	Orientation of the element	Rectangle Circle	Circle
AlarmText	Optional text for active (=1) state.	Text	No text
NormalText[40]	Optional text for inactive (=0) state.	Text	No text
AlarmColor[41]	Background color for active (=1) state.	Text	plgFillColorOn
Normal Color[42]	Background color for inactive (=0) state.	Color	plgFillColorOff
AlarmTextColor[43]	Text color for active (=1) state.	Color	plgLinesInsideOn
Normal TextColor[44]	Text color for inactive (=0) state.	Color	plgLinesInsideOff
Frame Width	Frame width of selected shape	Integer	1
Alarm Text Visible	If “TRUE” assigned AlarmText Visible	Boolean	TRUE
Normal Text Visible	If “TRUE” assigned NormalText Visible	Boolean	TRUE

Using the text option of the LED element, “dynamic” text elements can be created. An example is shown in **Table 6-6: Color Mapping for LED Display Element with Text**

[40] Only for signals with priority 1
[41] Only for signals with priority 1
[42] Only for signals with priority 1
[43] Only for signals with priority 1
[44] Only for signals with priority 1

Table 6-6: Color Mapping for LED Display Element with Text

State	Active Error	Inactive Error	Active Acknowledged	Acknowledged	Inactive Acknowledged	Acknowledged
0			Not applicable		Not applicable	
1			Flashing		Flashing	
2			Flashing		Flashing	
3			Flashing		Flashing	
4			Not applicable		Not applicable	

Using the color options of the LED element, special indications for binary signals can be created. An example is shown in **Table 6-7: Sample Color Mapping for LED Display Element using Color Options**

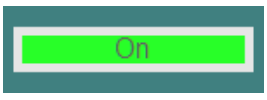
Table 6-7: Sample Color Mapping for LED Display Element using Color Options

	Active Error	Inactive Error	Active	Inactive
Example 1			 AlarmColor: PlgSetPoint AlarmTextColor: Not defined	 NormalColor: PlgOut NormalTextColor: Not defined
Example 2			 AlarmColor: PlgFillColorOff AlarmTextColor: PlgSetPoint	 NormalColor: PlgFillColorOff NormalTextColor: PlgOut

6.7.2.2 Display Element *StatusText*

The Status Text element shows the value of a binary signal as colored text field.

Table 6-8: Color Mapping for StatusText Display Element

Priority	Inactive Error	Active Acknowledged	Acknowledged	Inactive Acknowledged	Acknowledged
0		Not applicable		Not applicable	

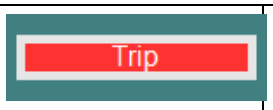
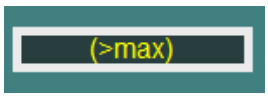
1		 Flashing		Flashing	
2		Flashing		Flashing	
3		Flashing		Flashing	

Table 6-9: Input Properties for Display Element StatusText

Property	Meaning	Value	Default
HAlign	Horizontal Alignment of the text	Left Center Right	Center
FrameWidth	Width of the rectangles frame	Integer	1
AlarmText	Optional text for active (=1) state.	Text	Alarm text of the object
NormalText	Optional text for inactive (=0) state.	Text	Normal text of the object
AlarmColor[45]	Background color for active (=1) state.	Text	plgFillColorOn
Normal Color[46]	Background color for inactive (=0) state.	Color	plgFillColorOff
AlarmTextColor[47]	Text color for active (=1) state.	Color	plgLinesInsideOn
Normal TextColor[48]	Text color for inactive (=0) state.	Color	plgLinesInsideOff

Using the text option of the LED element, “dynamic” text elements can be created. In the example shown in , the following property settings have been made:
AlarmText: “>”
NormalText : “<”

Table 6-10: Color Mapping for StatusText Display Element with Configured Texts.

Priority	Error	Active Acknowledged	Acknowledged	Inactive Acknowledged	Acknowledged
0	P max	Not applicable	P max	Not applicable	P max
1	P max	P max Flashing	P max	P max Flashing	P max

[45] Only for signals with priority 1
[46] Only for signals with priority 1
[47] Only for signals with priority 1
[48] Only for signals with priority 1

2	P max	P max Flashing	P max	P max Flashing	P max
3	P max	P max Flashing	P max	P max Flashing	P max

Using the color options of the StatusText element, special indications for binary signals can be created. An example is shown in Table 6-11: Sample Color Mapping for StatusText Display Element using Color Options

Table 6-11: Sample Color Mapping for StatusText Display Element using Color Options

	Error	Active	Inactive
Example 1		AlarmColor: PlgSetPoint AlarmTextColor: Not defined	NormalColor: PlgOut NormalTextColor: Not defined
Example 2		AlarmColor: PlgFillColorOff AlarmTextColor: PlgSetPoint	NormalColor: PlgFillColorOff NormalTextColor: PlgOut

6.7.2.3 Display Elements *Flame*

Table 6-12: Color mapping for Flame Display Element

Priority	Error Active	Error Inactive	Active	Inactive
All				

Table 6-13: Input Properties for Display Element Flame

Property	Manning	Value	Default
Direction	Direction of the flame	Left Right Up Down	Right

6.7.2.4 Display Elements 1WayValve

Table 6-14: Color mapping for 1WayValve Display Element

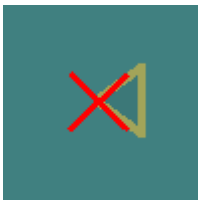
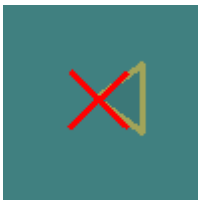
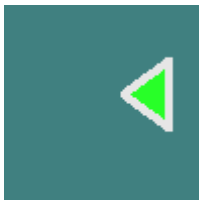
Priority	Error Active	Error Inactive	Active	Inactive
All				

Table 6-15: Input Properties for Display Element 1WayValve

Property	Manning	Value	Default
Direction	Direction of the flame	Left Right Up Down	Right

6.7.2.5 Display Element TagName

The display element Tagname shows the tagname (object name).

Figure 6-9: Display Element TagName

6.7.2.6 Display Element Description

The display element Description shows the description text.

Figure 6-10: Display Element Description

6.7.2.7 Display Element Address

The display element Address shows the Procontrol address.

Figure 6-11: Display Element Address

Format <Bus>.<Station>.<Device>.<Bit>

6.7.3 Digital Input

6.7.3.1 Faceplates

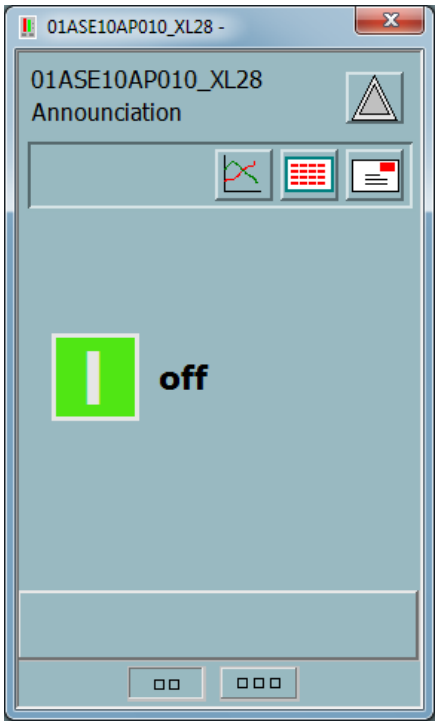


Figure 6-12: Digital Input Signal Faceplate

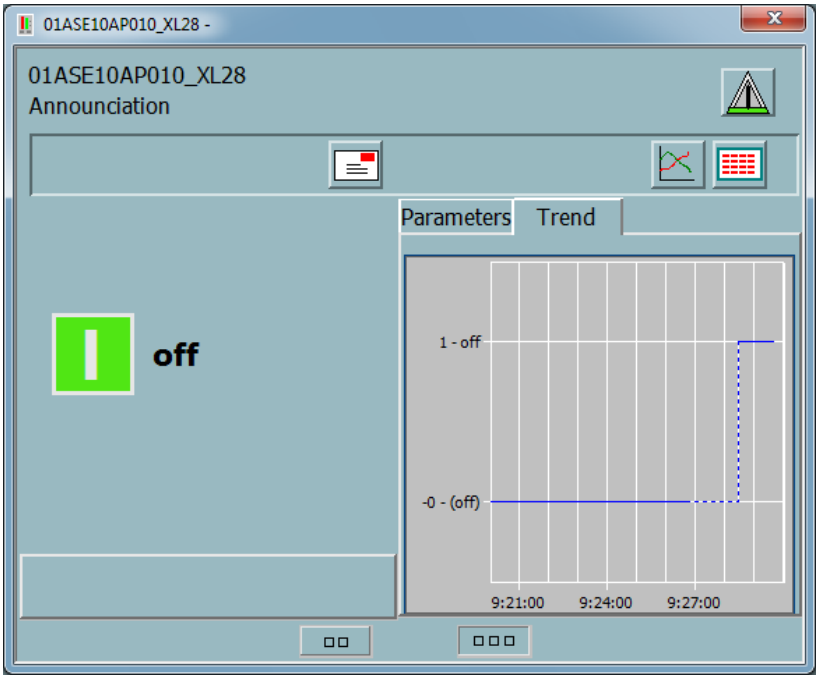


Figure 6-13: Digital Input Signal Extended Faceplate

Parameters Tab
Parameters show the Procontrol P13 Address of the signal.

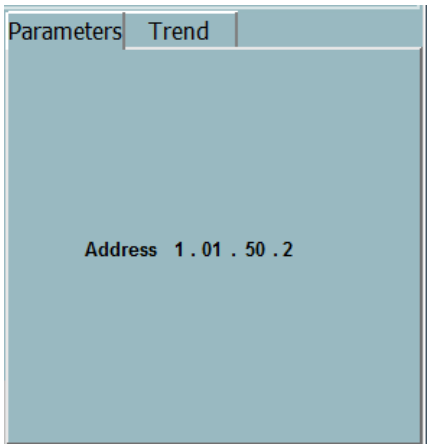


Figure 6-14: Parameters Tab

Trend Tab
Trend Tab shows the Procontrol P13 value of the signal in trend form.

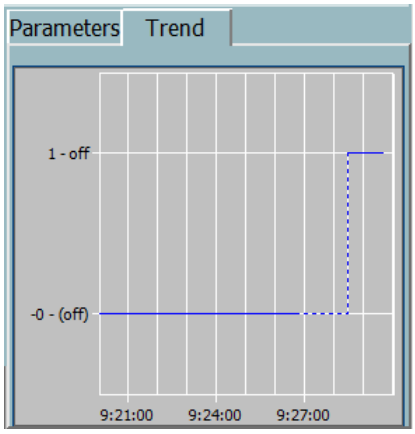


Figure 6-15: Trend Tab

6.7.4 Digital Output

6.7.4.1 Faceplates

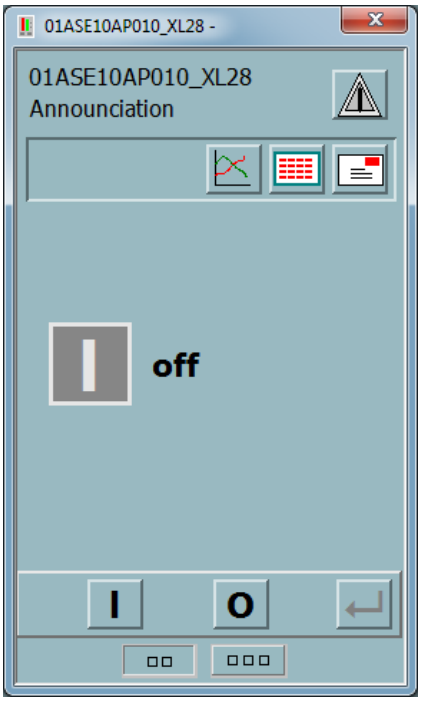


Figure 6-16: Digital Output Signal Faceplate

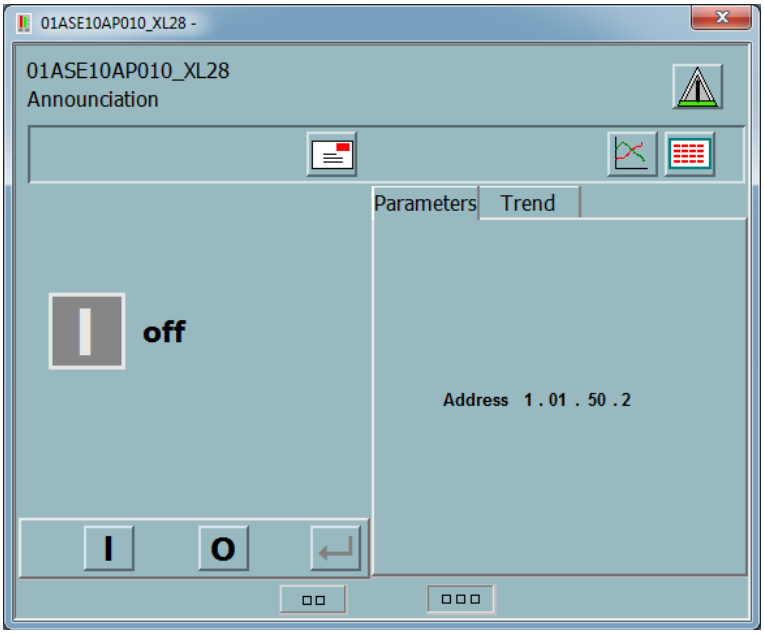


Figure 6-17: Digital Output Signal Extended Faceplate

Parameters Tab
Parameters show the Procontrol P13 Address of the signal.

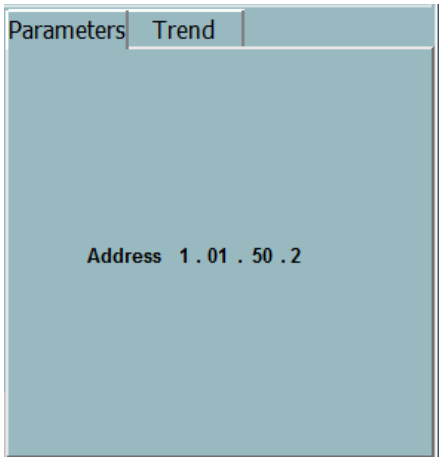


Figure 6-18: Parameters Tab

Trend Tab
Trend Tab shows the Procontrol P13 value of the signal in trend form.

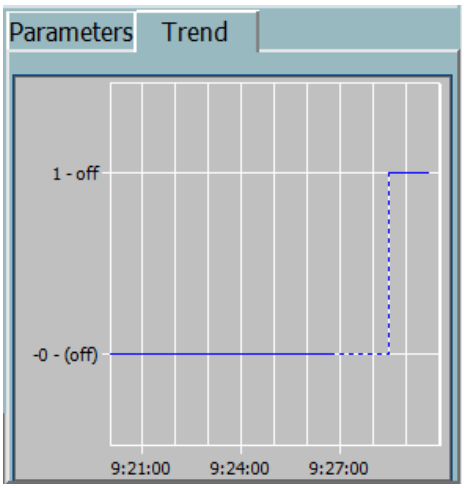


Figure 6-19: Trend Tab

6.8 Analog Signals

6.8.1 Faceplates

6.8.2 General structure

The faceplates for AI signals provides value and limit information.

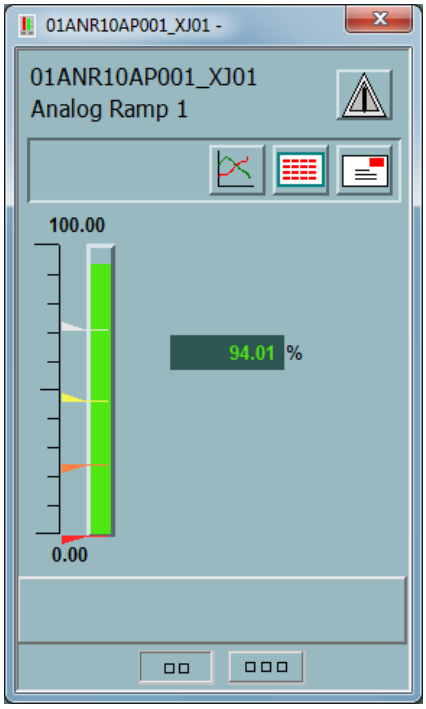


Figure 6-20: Analog Signal Faceplate

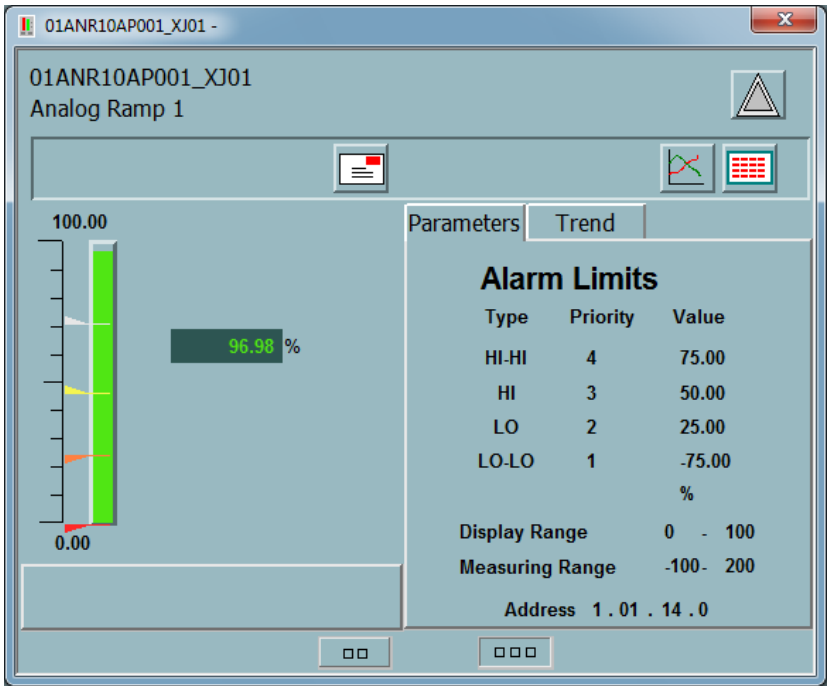


Figure 6-21: Analog Signal Extended Faceplate

6.8.3 Parameters Tab

For details on numeric and bar representation

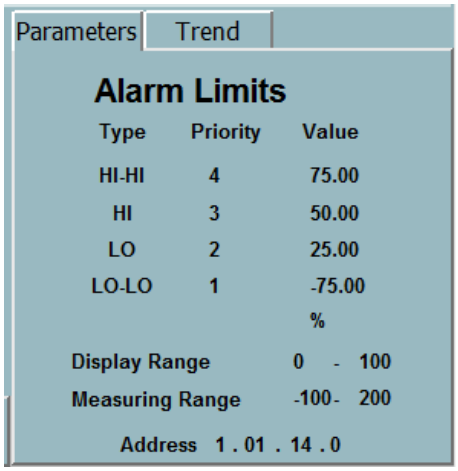


Figure 6-22: Analog Signal Faceplate – Parameters Tab

6.8.4 Trend Tab

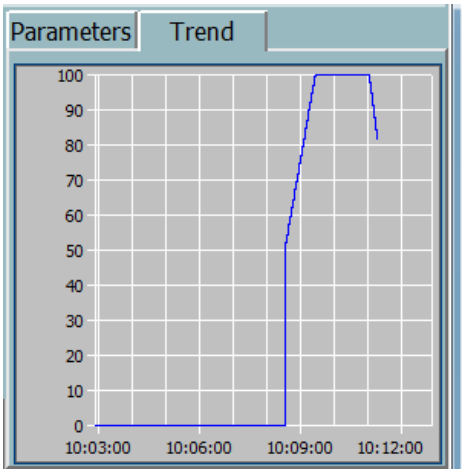


Figure 6-23: Analog Signal Faceplate

6.8.5 Display Elements

6.8.5.1 Display Element *Bar*

The Bar element shows the value of the analog signal as length of a bar. Additionally it shows the position and type of the limits configured for the analog signal. A corresponding coloring of the bar indicates the limit state.

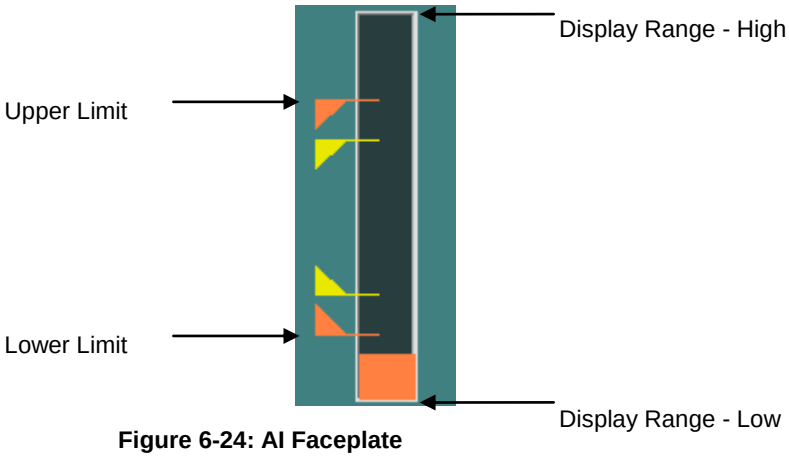


Figure 6-24: AI Faceplate

6.8.5.2 Properties

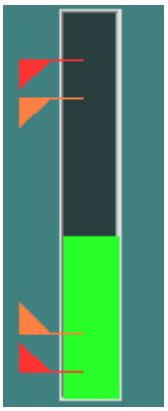
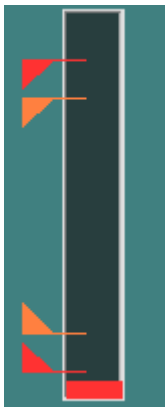
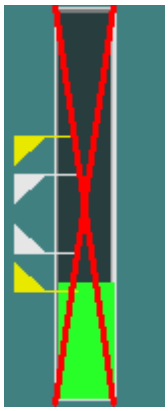
The following table lists the properties of the Bar element:

Table 6-16: Input Properties for Display Element Bar

Property	Manning	Value	Default
Orientation	Orientation of the bar	Horizontal Vertical	Vertical

6.8.5.3 State Indication

Table 6-17: Sate Indication for Bar Display Element

State	Normal	Prio1Alarm	Prio2Alarm	Prio3Alarm	Mode Disturbance (Error)	Signal Disturbance(Bad Value)
Acknowledged						
Unacknowledged Alarm	Blinking	Blinking	Blinking	Blinking	Blinking	-

6.8.5.4 Element *Scale*

The Scale element can be used in combination with the bar element. The scale limits are taken form the analog signal object.

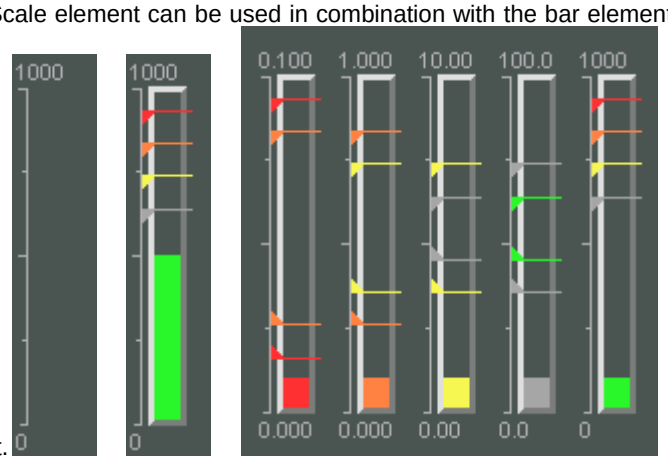


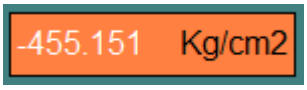
Figure 6-25: Bar Element combined with Scale Element

6.8.5.5 Display Element *Numeric*

The Numeric element shows the value of the analog signal in numeric form together with the measuring unit. The number of decimal digits are defined by the signal's corresponding configuration parameter (NoDecs).

The limit states are indicated by colors as shown in the following table.

Table 6-18: State Indication for Display Element Numeric

State	Acknowledged	Unacknowledged
Normal		Flashing
Alarm Prio 1		Flashing
Alarm Prio 2		Flashing
Alarm Prio 3		Flashing
Signal Disturbance		-

6.8.5.6 Display Element *Value*

The display element Value shows the value only without the measuring unit.

Figure 6-26: Display Element Value

6.8.5.7 Display Element *TagName*

The display element Tagname shows the tagname (object name).

Figure 6-27: Display Element TagName

6.8.5.8 Display Element *Description*

The display element Description shows the description text.

Figure 6-28: Display Element Description

6.8.5.9 Display Element *Address*

The display element Address shows the Procontrol address.

Figure 6-29: Display Element Address

Format <Bus>.<Station>.<Device>.<Bit>

6.8.6 Analog Input

6.8.6.1 Faceplates

6.8.6.2 General Structure

The faceplate for AI signals provides value and limit information.

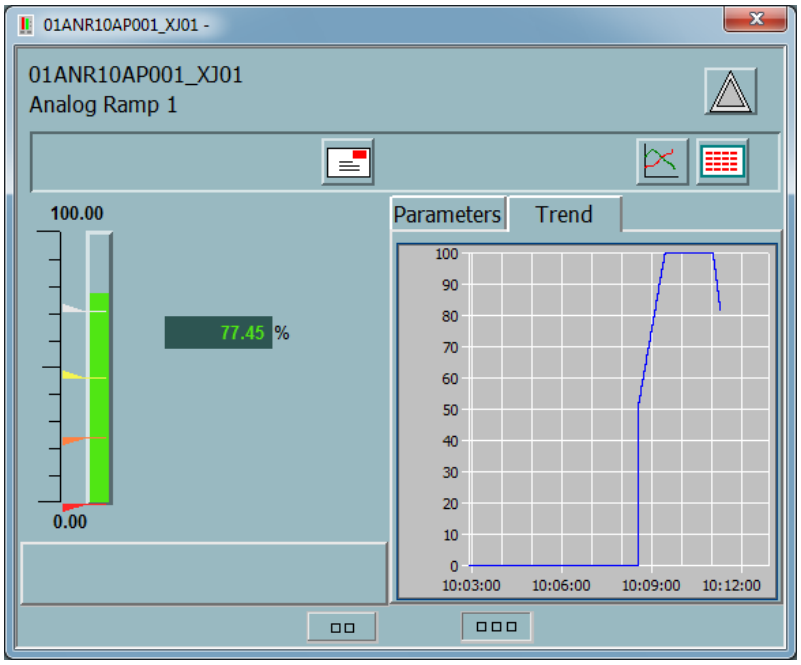


Figure 6-30: Analog Input Signal Faceplate

Parameters Tab
For details on numeric and bar representation

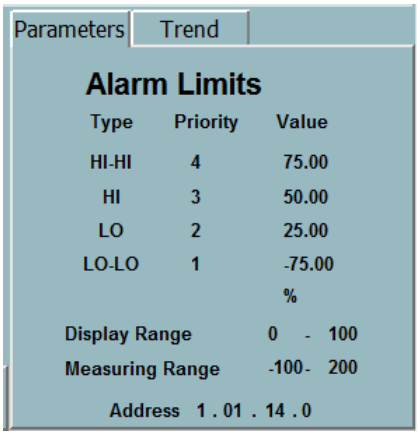


Figure 6-31: Parameters Tab

Trend Tab

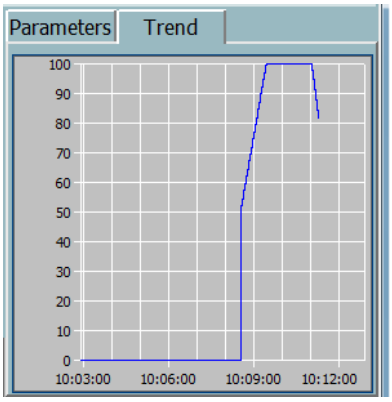


Figure 6-32: Trend Tab

6.8.7 Analog Output

6.8.7.1 Faceplates

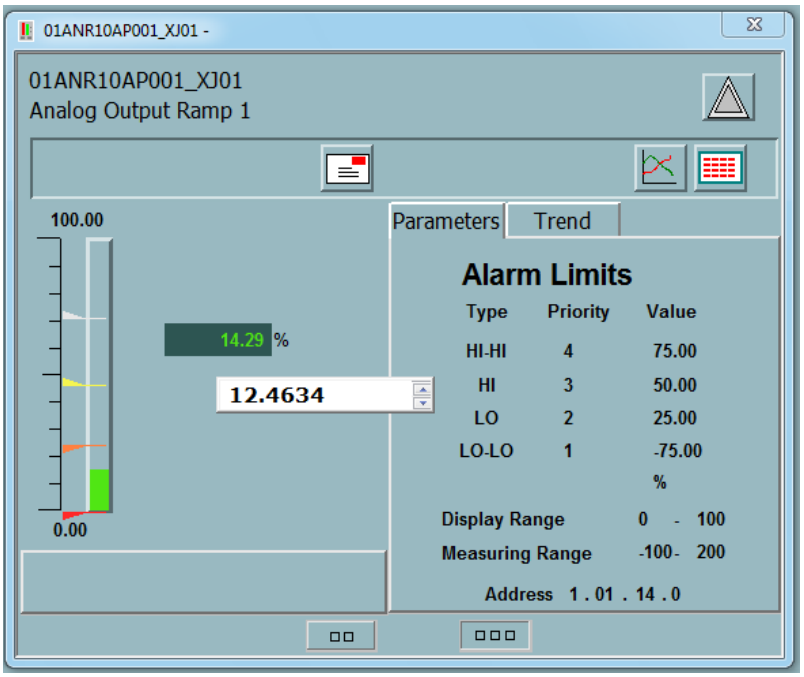


Figure 6-33: Analog Output Signal Faceplate

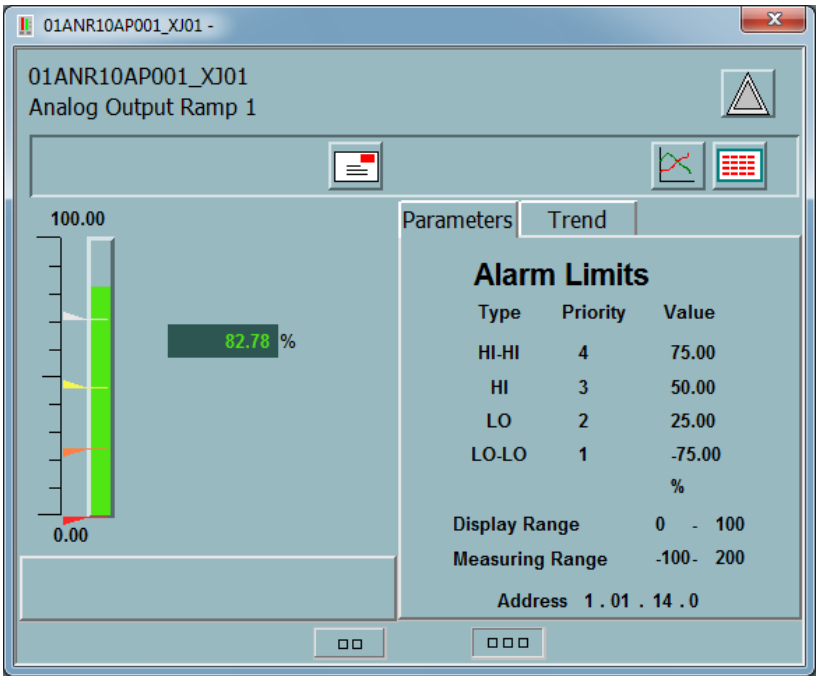


Figure 6-34: Analog Output Signal Extended Faceplate

6.9 Binary Control

6.9.1 Faceplates

6.9.1.1 General structure

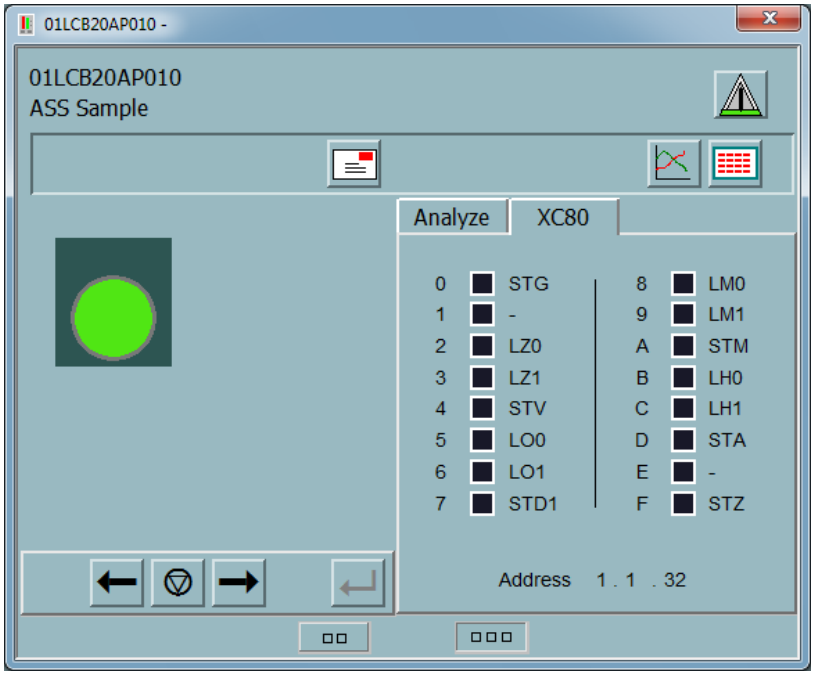
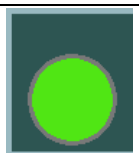


Figure 6-35: Binary Control Faceplate

6.9.1.2 State Indication

Table 6-19: State Indication

State	State Indication Normal	State Indication Disturbed
On / Open		
Off / Closed		
Opening		
Closing		

Undefined		
Error		

6.9.1.3 Analyze Tab

The Analyze tab allows retrieving information on Release and Protection criteria for the control objects.

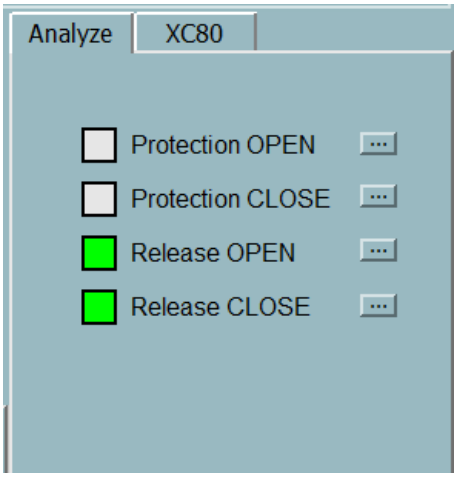


Figure 6-36: Binary Control Faceplate – Analyze Tab

6.9.1.4 XC80 Tab

The Analyze tab allows retrieving information on XC80 Telegram for the control objects.

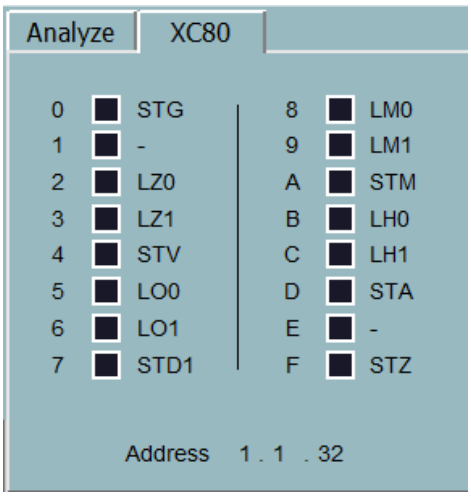
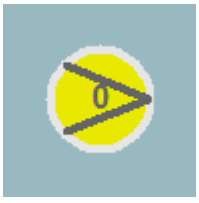
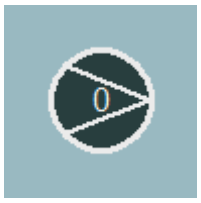
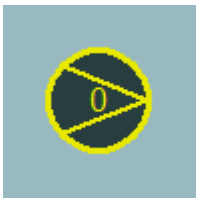
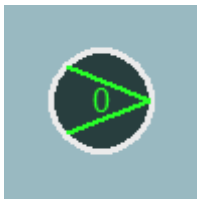
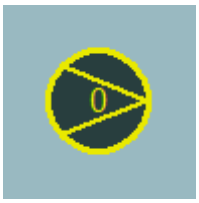


Figure 6-37: Binary Control Faceplate - XC80 Tab

6.9.2 Display Elements

6.9.2.1 Display Element *Pump*

Table 6-20: Binary Control Display Element Pump

State	State Indication Normal	State Indication Disturbed
Error		
On		
Off		
Intermediate		

6.9.2.2 Display Element *Heater*

Table 6-21: Binary Control Display Element Heater

State	State Indication Normal	State Indication Disturbed
Error		
On		
Off		
Intermediate		

6.9.2.3 Display Element *Motor*

Table 6-22: Binary Control Display Element Motor

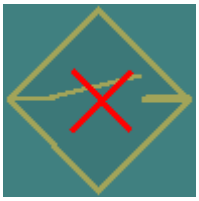
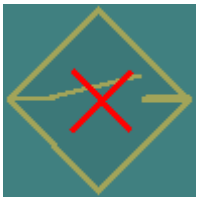
State	State Indication Normal	State Indication Disturbed
Error		
On		
Off		
Intermediate		

Table 6-23: Input Properties for Display Element Motor

Property	Meaning	Value	
MotorText	Letter inside element	Any Letter or empty. Example: “M”: Motor “G” : Generator	

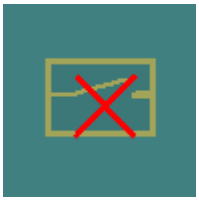
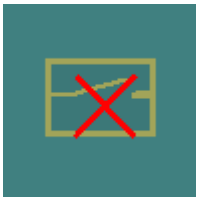
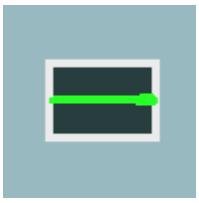
6.9.2.4 Display Element *Breaker*

Table 6-24: Binary Control Display Element Breaker

State	State Indication Normal	State Indication Disturbed
Error		
ON		
OFF		
Intermediate		

6.9.2.5 Display Element *Switch*

Table 6-25: Binary Control Display Element Switch

State	State Indication Normal	State Indication Disturbed
Error		
On		
Off		
Intermediate		

6.9.2.6 Display Element *Fan*

Table 6-26: Binary Control Display Element Fan

State	State Indication Normal	State Indication Disturbed
Error		
ON		
OFF		
Intermediate		

6.9.2.7 Display Element *Valve*

Table 6-27: Binary Control Display Element Valve

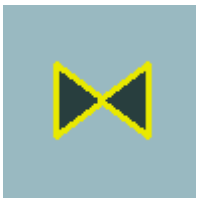
State	State Indication Normal	State Indication Disturbed
Error		
Open		
Closed		
Opening		
Closing		
Intermediate		

Table 6-28: Input Properties for Display Element Valve

Property	Meaning	Value	Default
Orientation	Orientation of the element	Horizontal Vertical	Horizontal

6.9.2.8 Display Element *3-Way Valve*

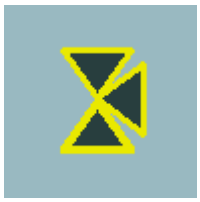
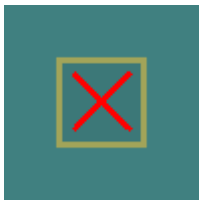
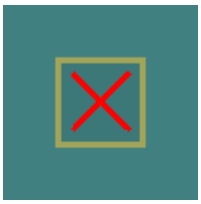
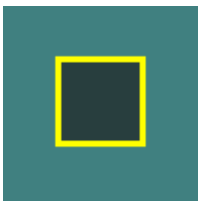
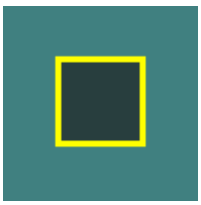
Table 6-29: Binary Control Display Element 3WayValve		
State	**State Indication Normal**	**State Indication Disturbed**
Error		
Open		
Closed		
Intermediate		

Table 6-30: Input Properties for Display Element 3WayValve			
Property	**Meaning**	**Value**	**Default**
Orientation	Orientation of the element	Horizontal Vertical	Horizontal
FlangeOpen	Allows to select the dynamic part	First Second Third	Third
FlangeStatic	Allows to select static parts	First Second Third	Second

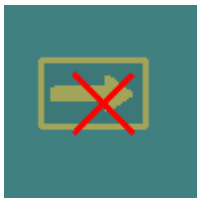
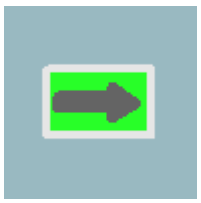
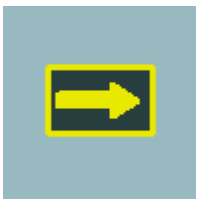
6.9.2.9 Display Element *Indicator*

Table 6-31: Binary Control Display Element Indicator

State	State Indication Normal	State Indication Disturbed
Error		
On		
Off		
Intermediate		

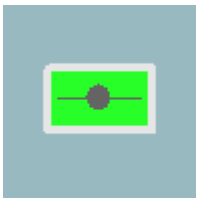
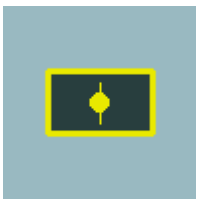
6.9.2.10 Display Element *Conveyer*

Table 6-32: Binary Control Display Element Conveyer

State	State Indication Normal	State Indication Disturbed
Error		
On		
Off		
Intermediate		

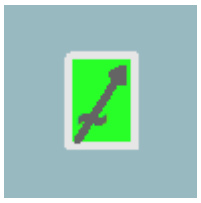
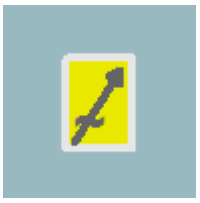
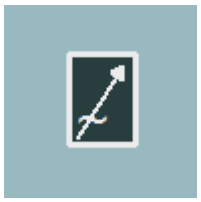
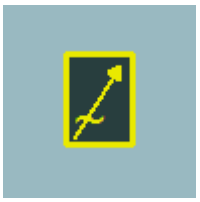
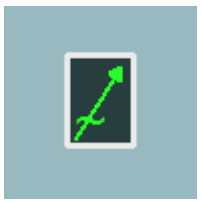
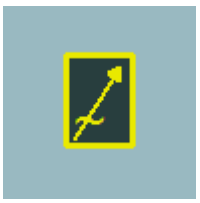
6.9.2.11 Display Element *Flap*

Table 6-33: Binary Control Display Element Flap

State	State Indication Normal	State Indication Disturbed
Error		
Open		
Closed		
Intermediate		

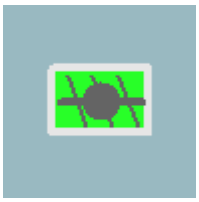
6.9.2.12 Display Element *FreqTrans*

Table 6-34: Binary Control Display Element FreqTrans

State	State Indication Normal	State Indication Disturbed
Error		
On		
Off		
Intermediate		

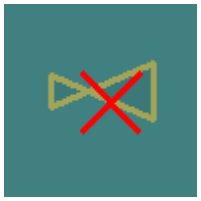
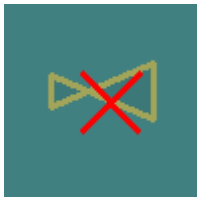
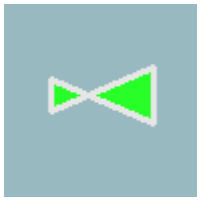
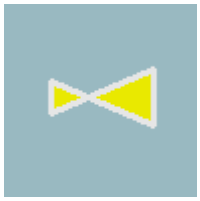
6.9.2.13 Display Element *GuideBlade*

Table 6-35: Binary Control Display Element GuideBlade

State	State Indication Normal	State Indication Disturbed
Error		
Open		
Closed		
Intermediate		

6.9.2.14 Display Element *PressReducer*

Table 6-36: Binary Control Display Element PressReducer

State	State Indication Normal	State Indication Disturbed
Error		
Open		
Closed		
Intermediate		

6.9.3 ASS

6.9.3.1 Faceplates

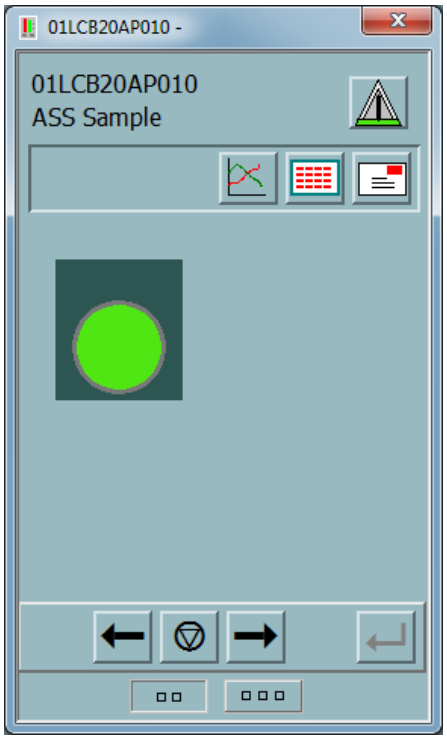


Figure 6-38: ASS Faceplate

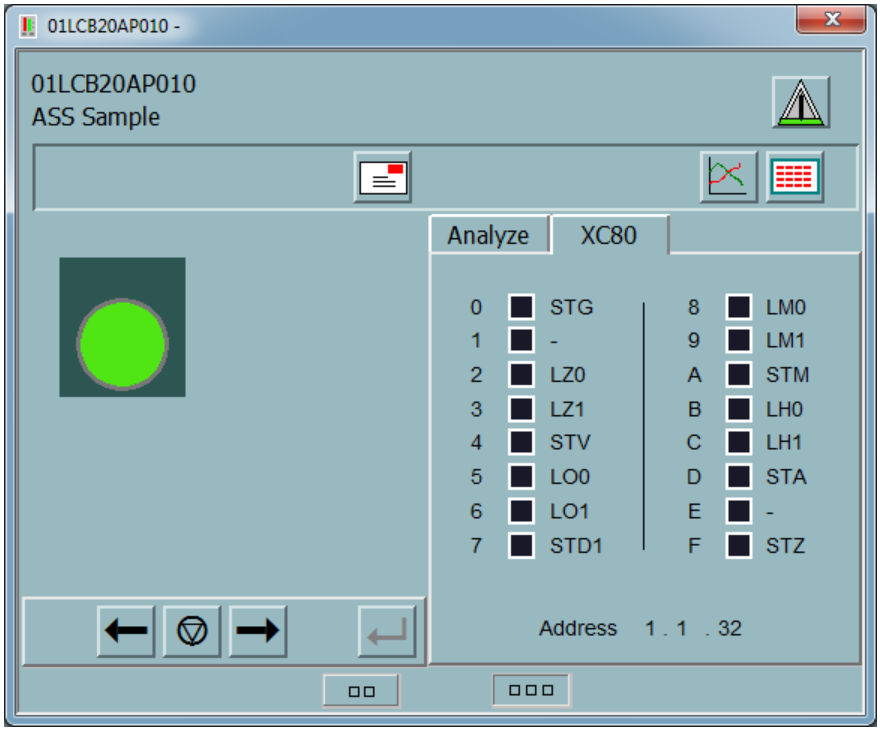


Figure 6-39: ASS Extended Faceplate

6.9.3.2 Faceplate “TIP” mode

If the subtype of an ASS is defined as “TIP”, operation is of the ASS is done in the TIP mode (“inching mode”), i.e. running to the desired position as long as the Command button is pressed.
The Command buttons are then provided as shown in the following picture.

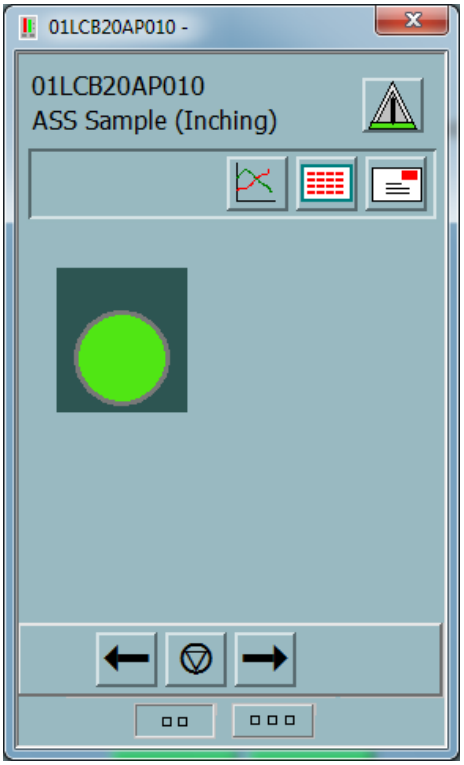


Figure 6-40: ASS Faceplate – TIP Mode

6.9.3.3 Feedback Signals to State Mapping

Table 6-37: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value							
Open	XL18	0	1	0	0	0	0	*	*
Opening	XL19	0	0	*	1	0	0	*	*
Closed	XL28	0	0	1	0	0	0	*	*
Closing	XL29	0	*	0	0	1	0	*	*
Disturbed	XL68	0	0	0	0	0	0	1	1
Acknowledged	XL69	0	*	*	*	*	*	0	1
			OPEN	CLOSED	OPENING	CLOSING	INTERMEDIATE	DISTURBED	DISTURBED ACKN

6.9.4 ASM

6.9.4.1 Faceplates

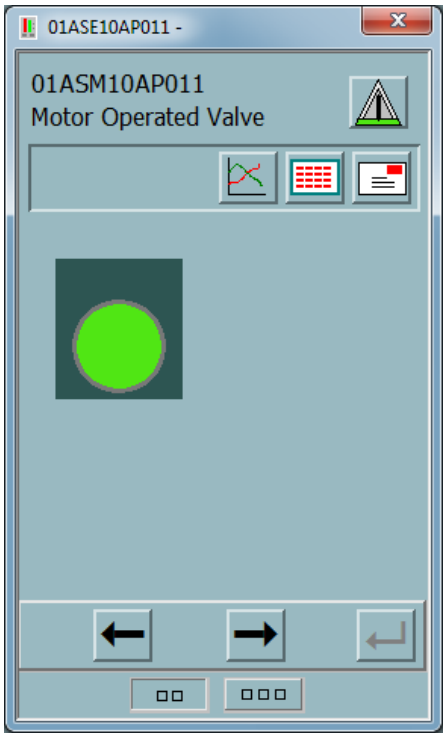


Figure 6-41: ASM Faceplate

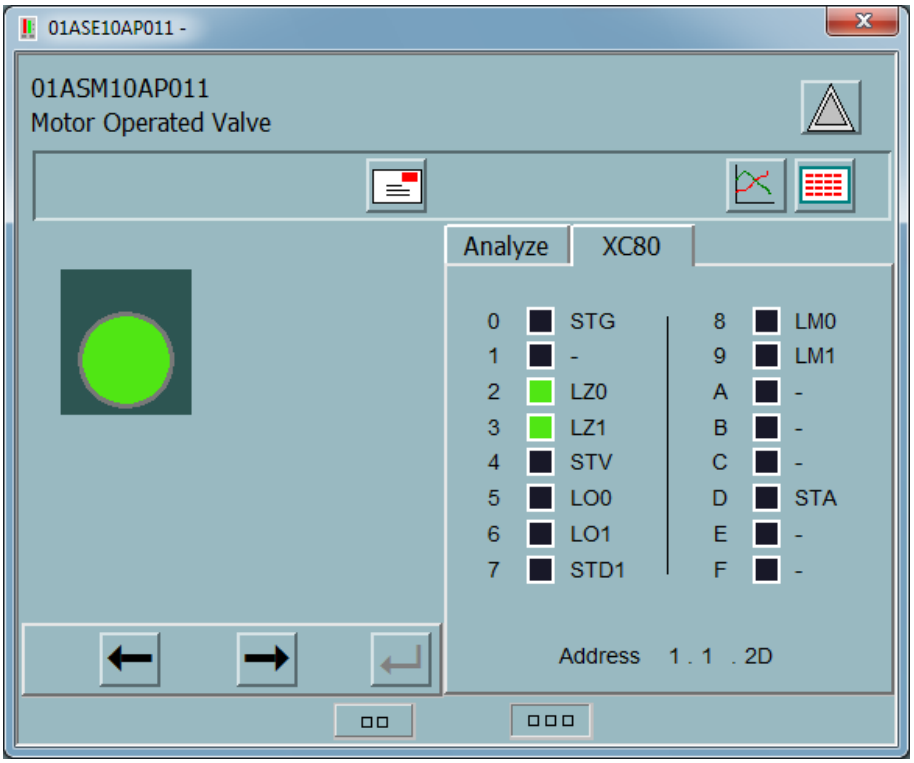


Figure 6-42: ASM Extended Faceplate

6.9.4.2 Feedback Signals to State Mapping

Table 6-38: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value							
Open	XL18	0	1	0	0	0	0	*	*
Opening	XL19	0	0	*	1	0	0	*	*
Closed	XL28	0	0	1	0	0	0	*	*
Closing	XL29	0	*	0	0	1	0	*	*
Disturbed	XL68	0	0	0	0	0	0	1	1
Acknowledged	XL69	0	*	*	*	*	*	0	1
			OPEN	CLOSED	OPENING	CLOSING	UNDEFINED	DISTURBED	DISTURBED ACKN

6.9.5 ASE

6.9.5.1 Faceplates

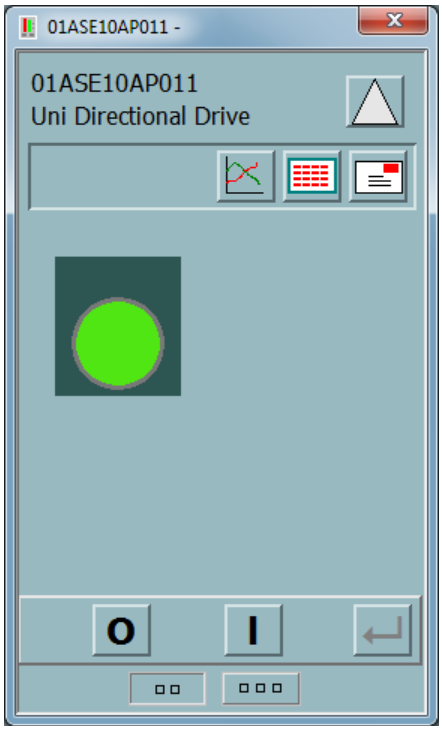


Figure 6-43: ASE Faceplate

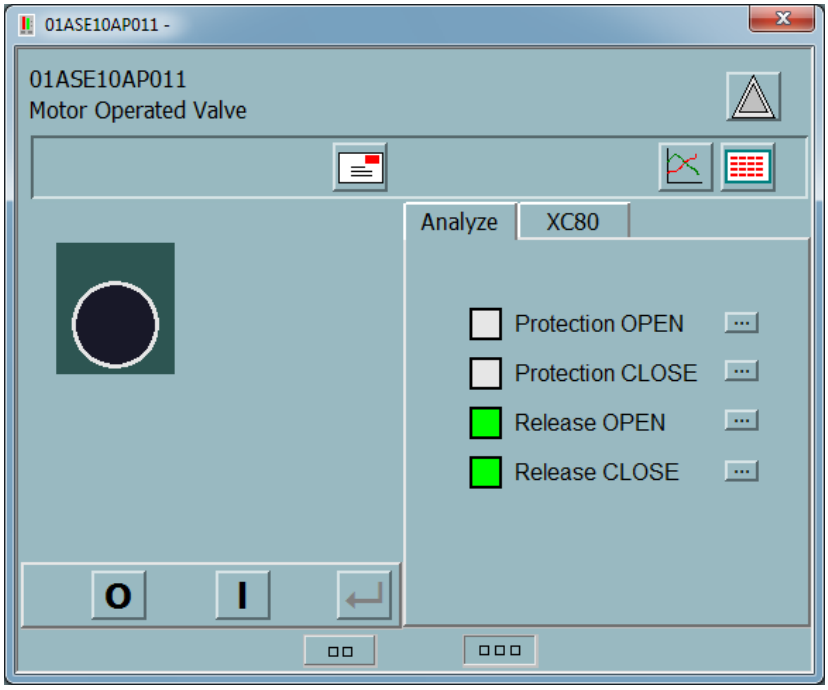


Figure 6-44: ASE Extended Faceplate

6.9.5.2 Feedback Signals to State Mapping

Table 6-39: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value				
On	XL18	0	1	0	x	x
Off	XL28	0	0	1	x	x
Disturbed	XL68	0	0	0	1	1
Acknowledged	XL69	0	*	*	0	1
			ON	OFF	DISTURBED	DISTURBED ACKN

6.10 Setpoint Control (HST/SWV)

6.10.1 Faceplates

6.10.1.1 General structure

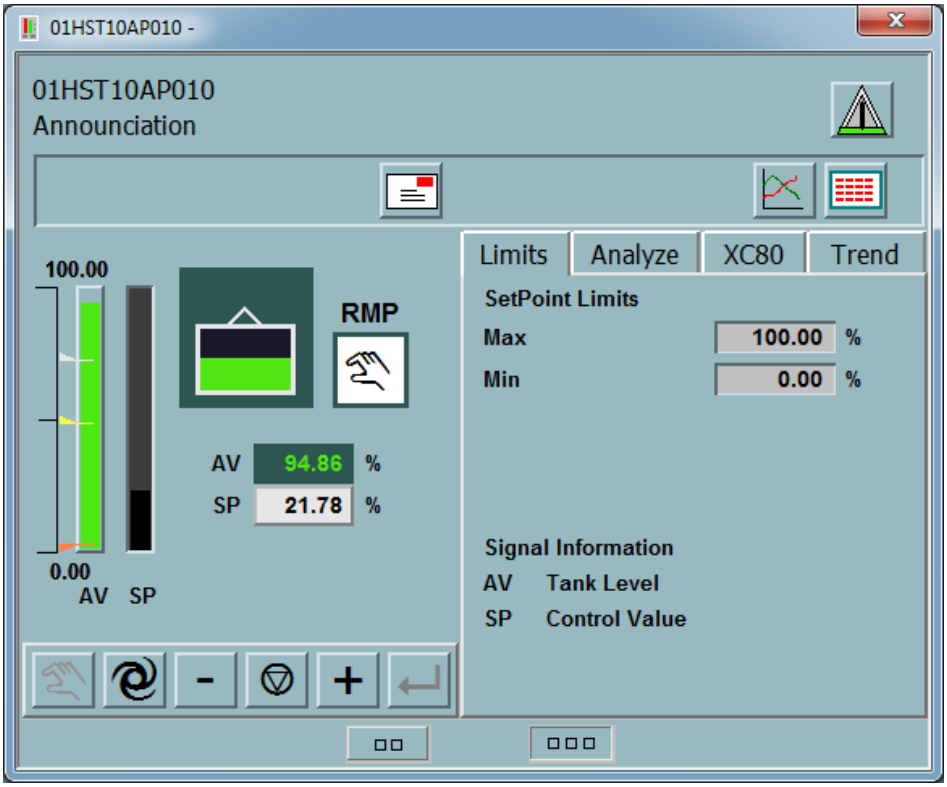
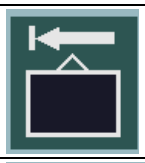
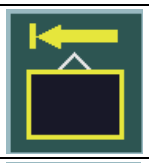
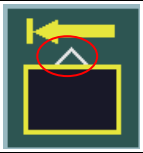
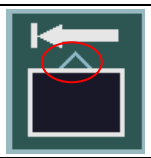
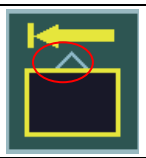
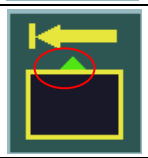
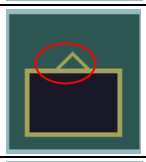
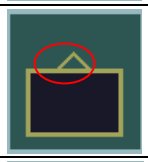


Figure 6-45: SetPoint Faceplate

6.10.1.2 State Indication

Table 6-40: State Indication

State	State Indication Normal	State Indication Disturbed	Auto/Manual Indication
Lower limit reached			
Higher limit reached			
Manual			In Status Symbol marked with red circle.

Manual by disturbance			In Status Symbol marked with red circle.
Automatic			In Status Symbol marked with red circle.
Undefined			In Status Symbol marked with red circle.
Error			

6.10.1.3 Trend Tab

The Trim curves tab allows showing a trend of setpoint value, the actual value and the Control value.

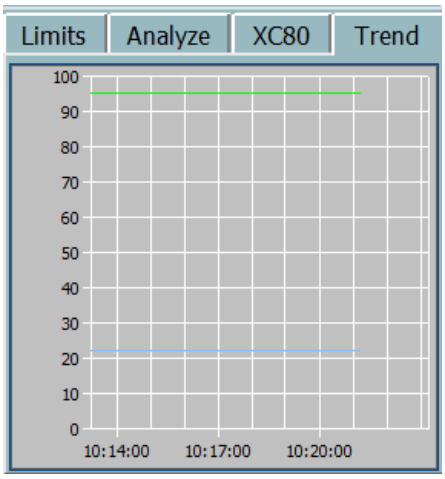


Figure 6-46: SetPoint Faceplate- Trend Tab

6.10.1.4 Mode Indication

Setpoint control object can be configured for two modes. The corresponding indication in the Faceplates is showing in the following table.

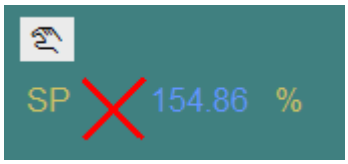
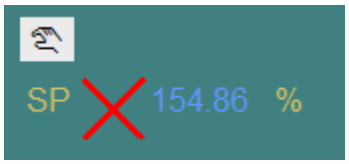
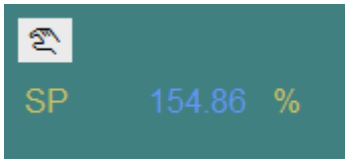
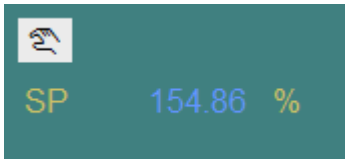
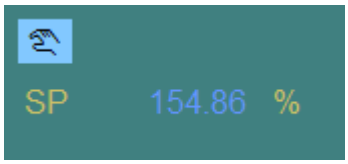
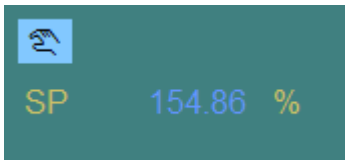
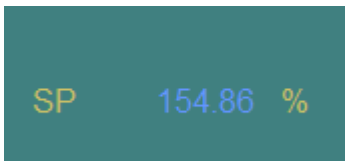
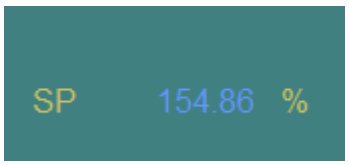
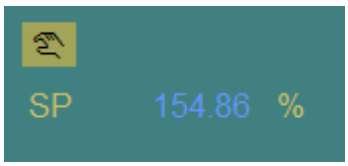
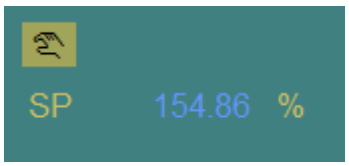
Table 6-41: Mode Indication

Mode	Mode Indication	Mode Description
Ramping Mode	RMP	This mode allows to Raise and Lower the setpoint with the “+” and “-“ buttons. The setpoint cannot be input as value.
Setpoint Mode	SET	This mode allows both, to Raise and Lower the setpoint with the “+” and “-“ buttons and to input the setpoint as value.

6.10.2 Display Elements

6.10.2.1 Display Element *SetPoint*

Table 6-42: Display Element SetPoint

State	State Indication Normal	State Indication Disturbed
Error		
Manual		
Manual by Disturbance		
Automatic		
Undefined		

6.10.3 HST

6.10.3.1 Faceplates

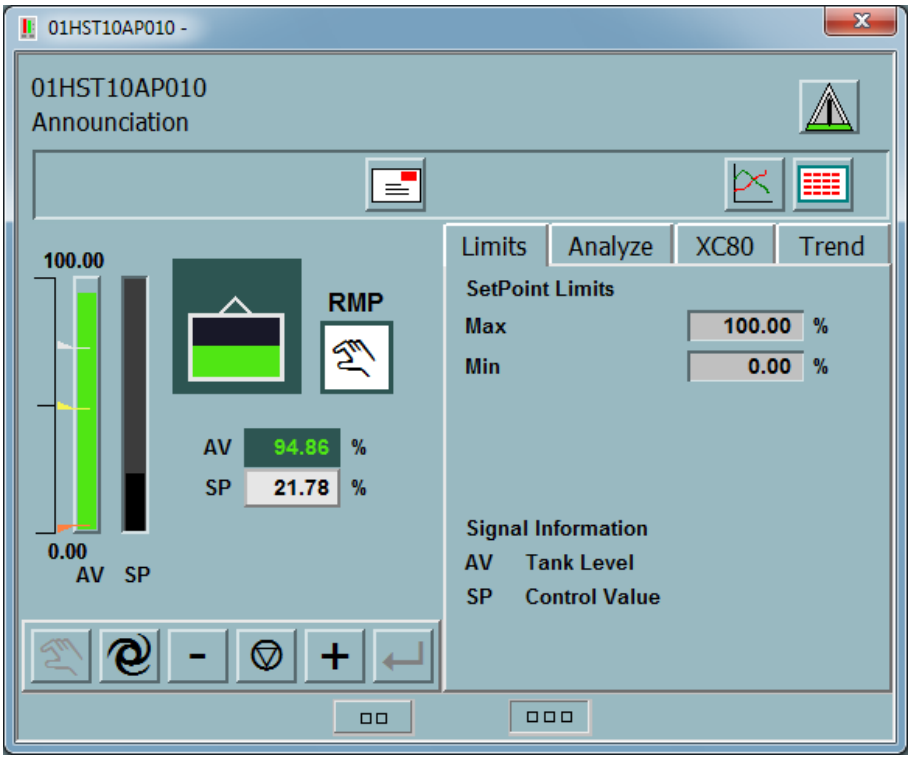


Figure 6-47: HST Faceplate

6.10.3.2 Feedback Signals to State Mapping

Table 6-43: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value							
Upper limit reached	XL19	0	1	0	*	*	*	*	*
Lower limit reached	XL29	0	0	1	*	*	*	*	*
Manual	XL79	0	*	*	1	0	0	*	*
Manual by disturbance	XL88	0	*	*	0	1	0	*	*
Automatic	XL89	0	*	*	0	0	1	*	*
Disturbed	XL68	0	0	0	0	0	0	1	1
Acknowledged	XL69	0	0	0	0	0	0	0	1
			UPPER LIMIT REACHED	UPPER LIMIT REACHED	MANUAL	MANUAL BY DISTURBANCE	AUTOMATIC	DISTURBED	DISTURBED ACKN

6.10.4 SWV

6.10.4.1 Faceplates

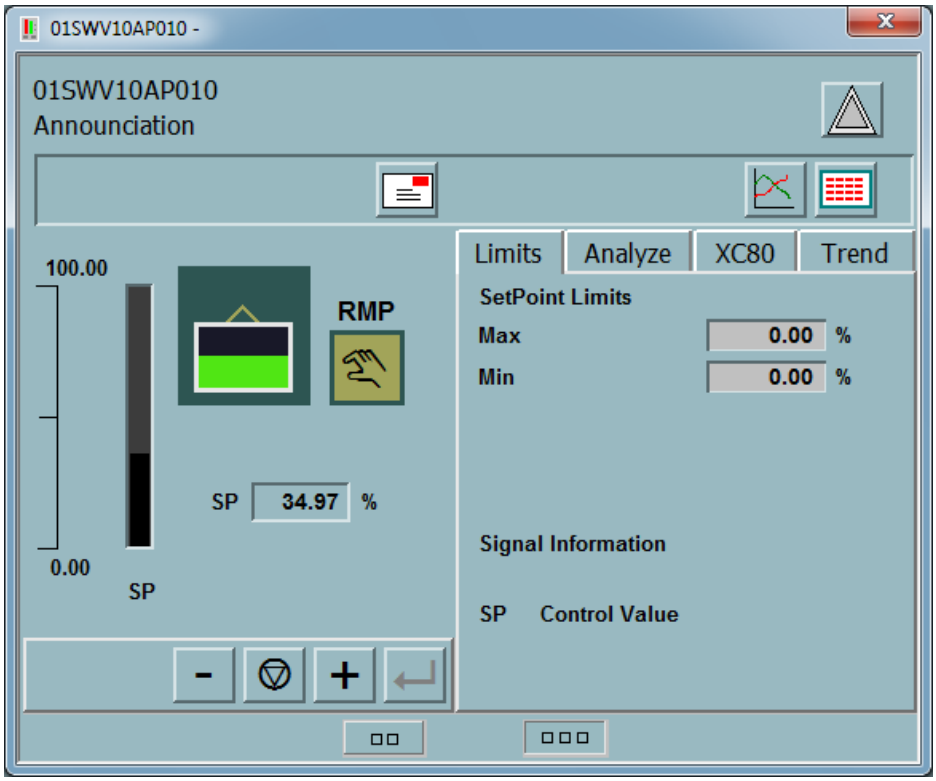


Figure 6-48: SWV Faceplate

6.10.4.2 Feedback Signals to State Mapping

Table 6-44: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value				
Upper limit reached	XL19	0	1	0	x	x
Lower limit reached	XL29	0	0	1	x	x
Disturbed	XL68	0	0	0	1	1
Acknowledged	XL69	0	0	0	0	1
			UPPER LIMIT REACHED	UPPER LIMIT REACHED	DISTURBED	DISTURBED ACKN

6.11 Analog Drive Control (ASI/ASP)

6.11.1 Faceplates

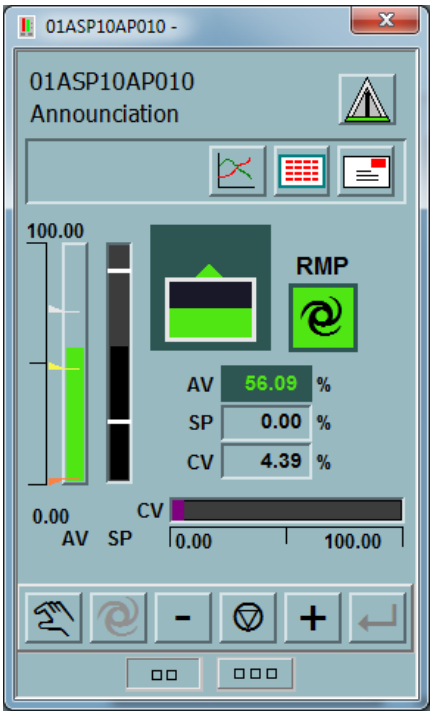


Figure 6-49: Analog Control Faceplate

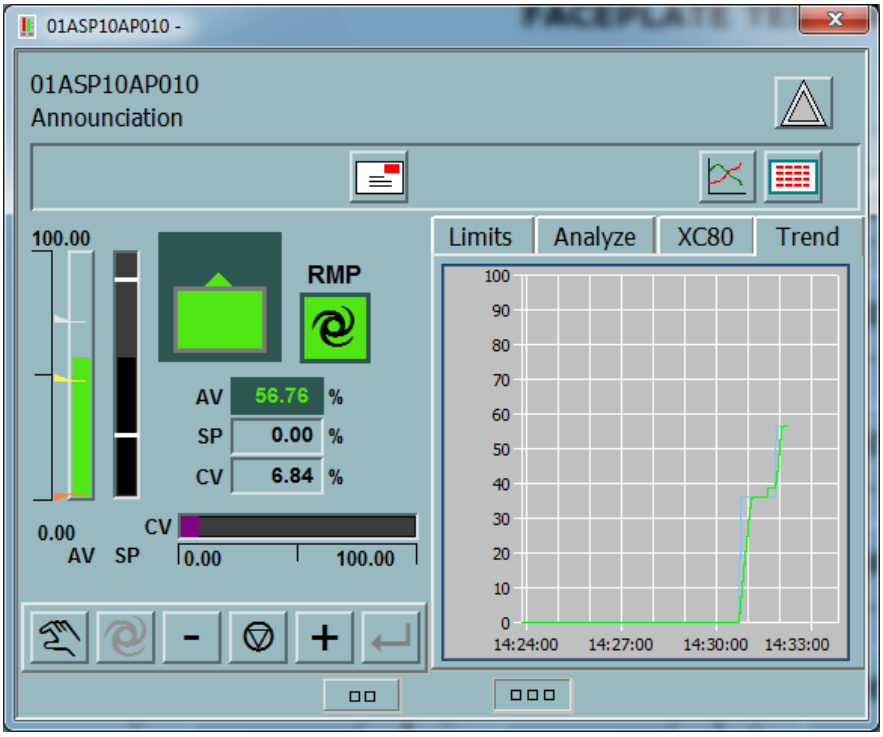
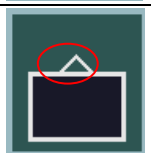
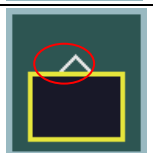
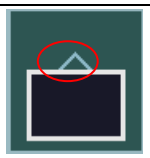
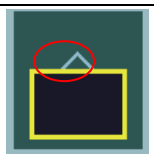
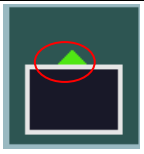
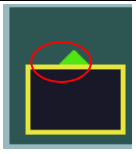
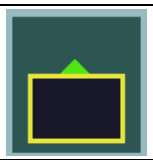
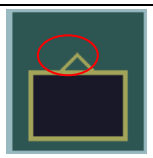
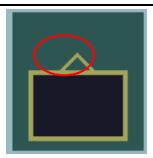


Figure 6-50: Analog Control Extended Faceplate

6.11.1.1 State Indication

Table 6-45: State Indication

State	State Indication Normal	State Indication Disturbed	Auto/Manual Indication
Error			
Manual			In Status Symbol marked with red circle.
Manual by Disturbance			In Status Symbol marked with red circle.
Automatic			In Status Symbol marked with red circle.
Open			

Opening	Arrow flashing		
Close			
Closing	Arrow flashing		
Undefined			In Status Symbol marked with red circle.

6.11.1.2 Analyze Tab

The Analyze Tab allows retreiving information on Release and Protection criteria for the control objects.

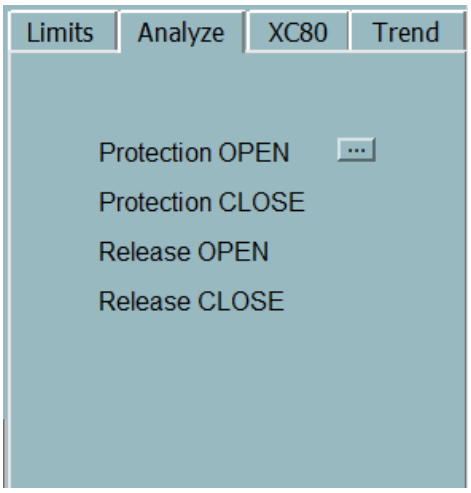


Figure 6-51: Analog Control Extended Faceplate – Analyze Tab

6.11.1.3 Trend Tab

The Trim Curves tab allows showing a trend of the setpoint value, the actual value and the Control value.

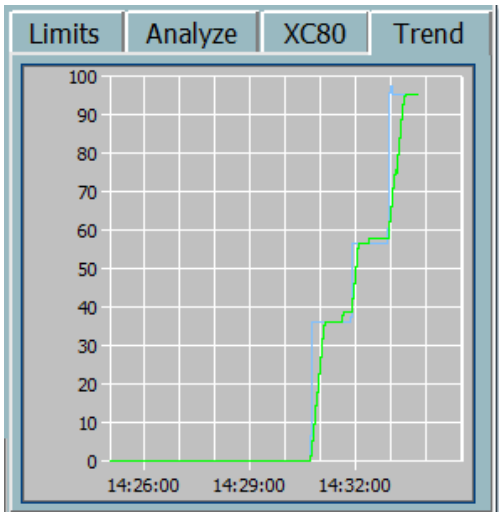


Figure 6-52: Analog Control Extended Faceplate – Trend Tab

6.11.1.4 XC80 Telegram Tab

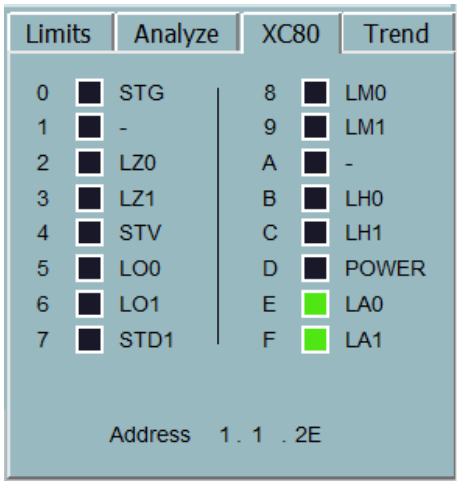


Figure 6-53: Analog Control Extended Faceplate – XC80 Tab

6.11.1.5 Limits Tab

Limits provides the Mininmum and Maximum range details of AV, SP and CV.

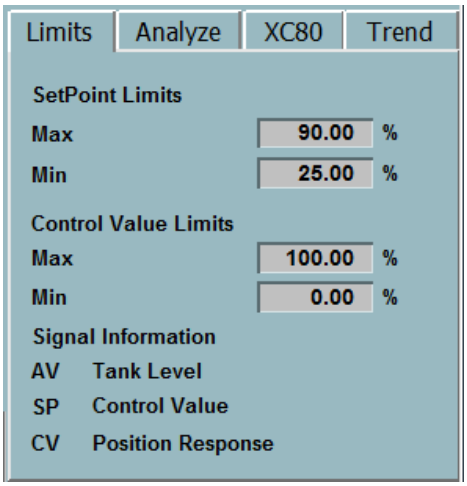


Figure 6-54: Analog Control Extended Faceplate – Limits Tab

6.11.1.6 Mode Indication

Setpoint control object can be configured for two modes.The corresponding indication in the Faceplates is showing in the following table.

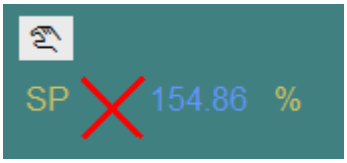
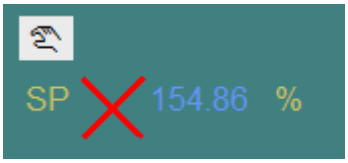
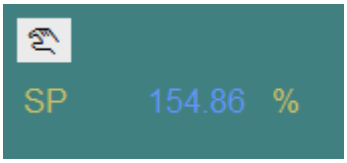
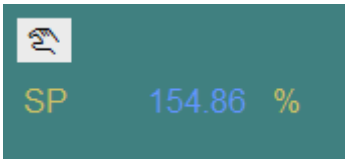
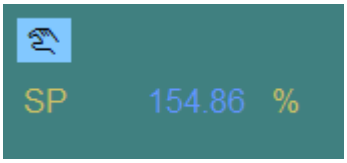
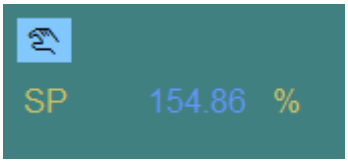
Table 6-46: Mode Indication

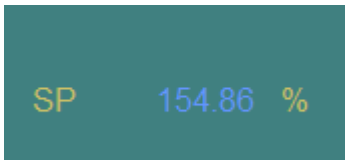
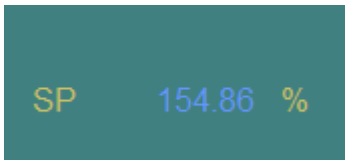
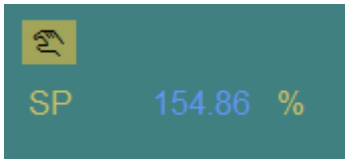
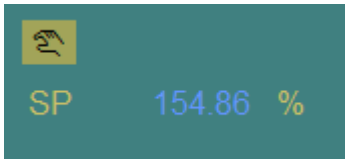
Mode	Mode Indication	Mode Description
Ramping Mode	RMP	This mode allows to Raise and Lower the setpoint with the “+” and “-“ buttons. The setpoint cannot be input as value.
Setpoint Mode	SET	This mode allows both, to Raise and Lower the setpoint with the “+” and “-“ buttons and to input the setpoint as value.

6.11.2 Display Elements

6.11.2.1 Display Element SetPoint

Table 6-47: Display Element SetPoint

State	State Indication Normal	State Indication Disturbed
Error		
Manual		
Manual by Disturbance		

Automatic		
Undefined		

6.11.2.2 Display Element *Valve*

Table 6-48: Display Element Valve

State	State Indication Normal	State Indication Disturbed
Error		
Manual		
Manual by Disturbance		
Automatic		
Open		

Opening		
Close		
Closing		
Undefined		

6.11.2.3 Display Element *3WayValve*

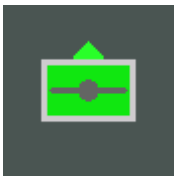
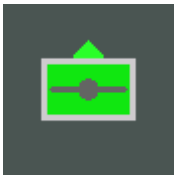
Table 6-49: Display Element 3-WayValve

State	State Indication Normal	State Indication Disturbed
Error		
Manual		
Manual by Disturbance		

Automatic		
Open		
Opening		
Close		
Closing		
Undefined		

6.11.2.4 Display Element *Flap*

Table 6-50: Display Element Flap

State	State Indication Normal	State Indication Disturbed
Error		
Manual		
Manual by Disturbance		
Automatic		
Open		
Opening		
Close		

Closing		
Undefined		

6.11.3 Feedback Signals to State Mapping

Table 6-51: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value									
Manual	XL79	0	1	0	0	*	*	*	*	*	*
Manual by disturbance	XL88	0	0	1	0	*	*	*	*	*	*
Automatic	XL89	0	0	0	1	*	*	*	*	*	*
Open	XL18	0	*	*	*	1	0	0	0	*	*
Opening	XL19	0	*	*	*	0	*	1	0	*	*
Closed	XL28	0	*	*	*	0	1	0	0	*	*
Closing	XL29	0	*	*	*	*	0	0	1	*	*
Disturbed	XL68	0	0	0	0	0	0	0	0	1	1
Acknowledged	XL69	0	0	0	0	0	0	0	0	0	1
			MANUAL	MANUAL BY DISTURBANCE	AUTOMATIC	OPEN	CLOSED	OPENING	CLOSING	DISTURBED	DISTURBED ACKN

6.12 Group Control GSA

6.12.1 Faceplates

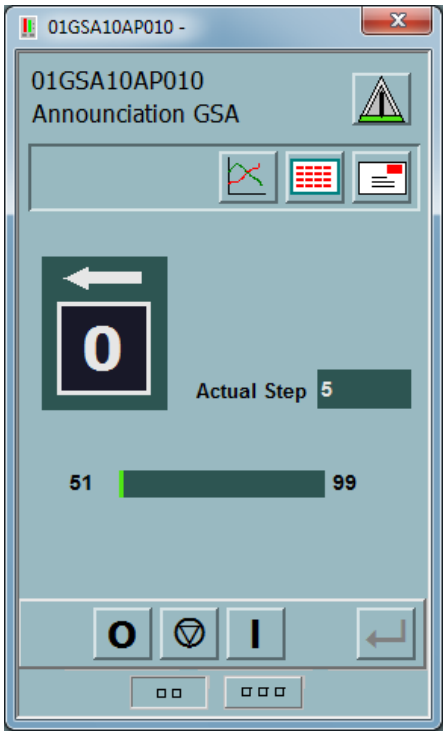


Figure 6-55: GSA Faceplate

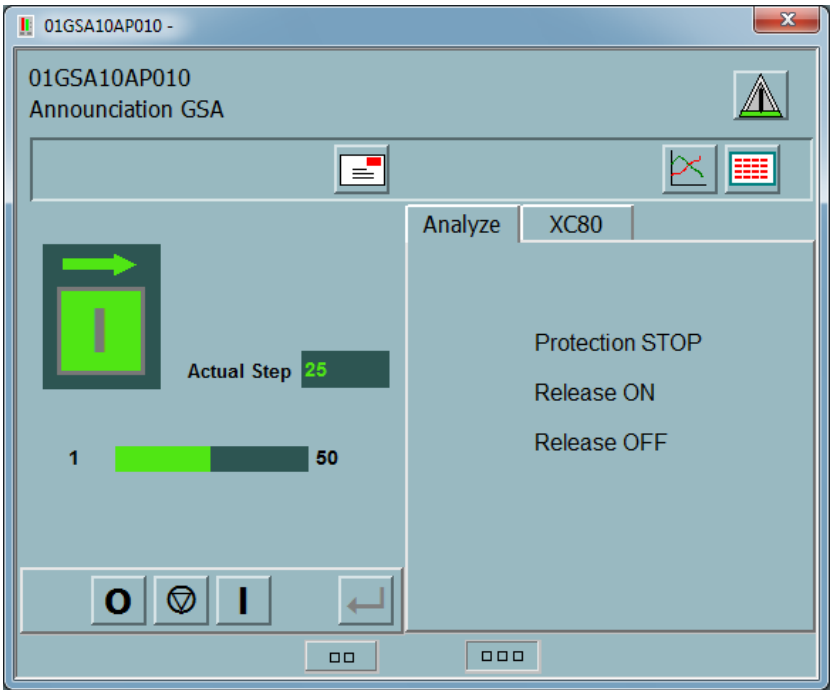
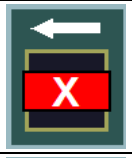
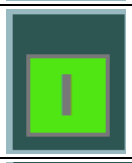
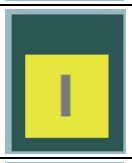
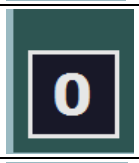
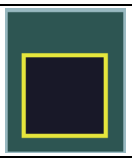


Figure 6-56: GSA Extended Faceplate

6.12.2 Faceplates Indication

Table 6-52: Faceplates Indication

State	State Indication Normal	State Indication Disturbed
Error		
ON		
OFF		
Running To ON		
Running To OFF		
UNDEFINED		
MANUAL / STOP		

6.12.3 Step Indication

The current step indication on the extended faceplates allows to monitor the current Step number in the “Running to ON” and in the “Running to OFF” state.

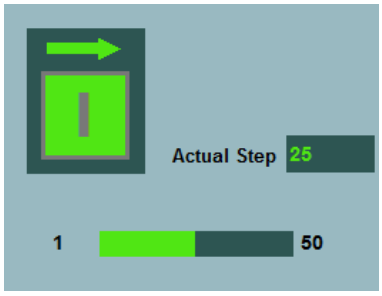


Figure 6-57: GSA Step Indication

6.12.4 Analyze Tab

The Analyze tab of the GSA allows retrieving information on Release and Protection criteria for start and stop of the GSA. Additionally information on step release conditions can be retrieved.

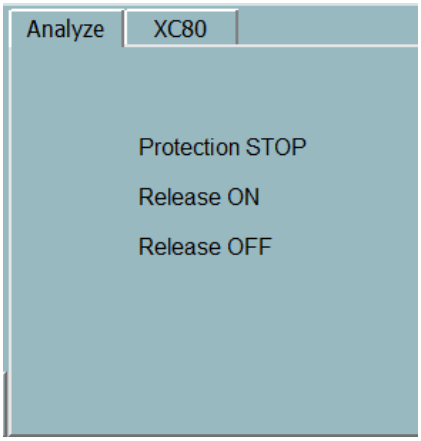
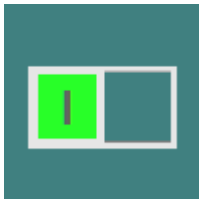
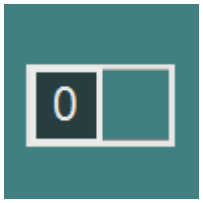
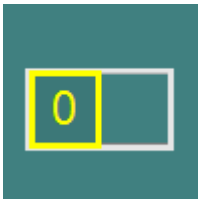
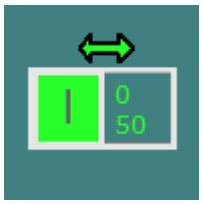
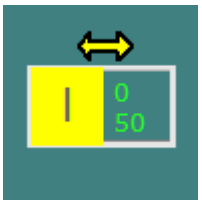
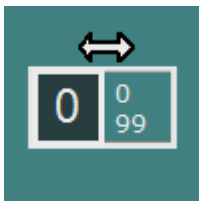
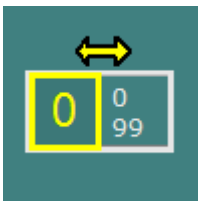
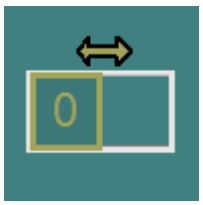
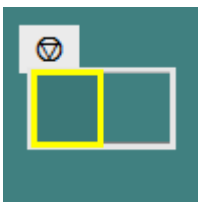
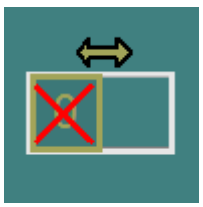


Figure 6-58: GSA Faceplate-Analyze Tab

6.12.5 Display Elements

Display Element GroupSequence01

Table 6-53: Display Element GroupSequence01

State	State Indication Normal	State Indication Disturbed
ON		
OFF		
Running To ON		
Running To OFF		
UNDEFINED		
STOP / MANUAL		
ERROR		

Feedback Signals to State Mapping

Table 6-54: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value							
ON	XL18	0	1	0	0	0	0	*	*
Running to ON	XL19	0	0	1	*	0	0	*	*
OFF	XL28	0	0	0	1	0	0	*	*
Running to OFF	XL29	0	*	0	0	1	0	*	*
Stop or Manual	XL59	0	0	0	0	0	1	*	*
Disturbed	XL68	0	0	0	0	0	0	1	1
Acknowledged	XL69	0	*	*	*	*	*	0	1
			ON	RUNNING TO ON	OFF	RUNNING TO OFF	STOP / MANUAL	DISTURBED	DISTURBED ACKN

6.13 Preselector Control

6.13.1 Faceplates

6.13.1.1 General Structure

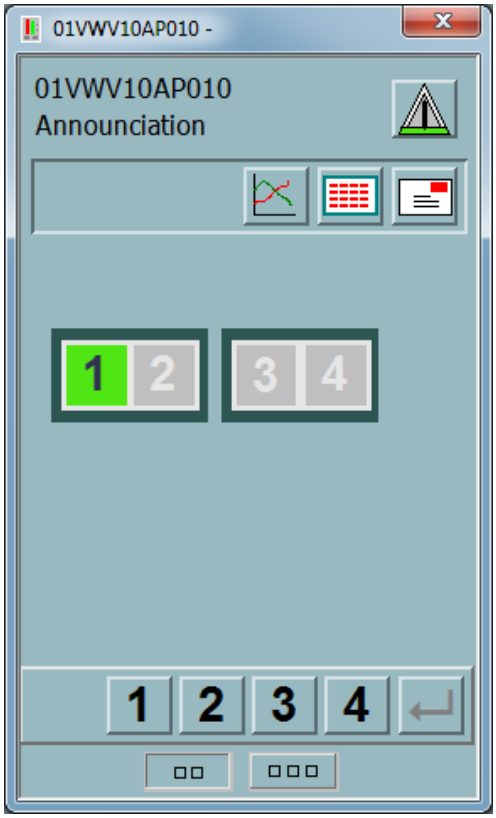
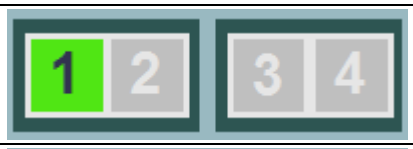
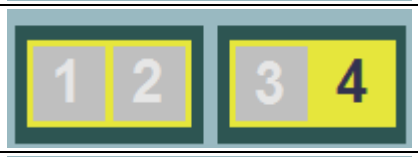


Figure 6-59: Preselector Faceplate

6.13.1.2 State Indication

The following table shows the state indication for VW4. The state Indication for VW2 and VW3 follow the same principle.

Table 6-55: State Indication

State	State Indication Normal	State Indication Disturbed
Unit 1 Selected		
Unit 2 Selected		
Unit 3 Selected		
Unit 4 Selected		
Unit 1 Difference Unit 2 Selected		
Unit 2 Difference Unit 3 Selected		
Unit 3 Difference Unit 4 Selected		
Unit 4 Difference Unit 1 Selected		
Error		

6.13.2 Feedback Signals to State Mapping

Table 6-56: Feedback Signals to State Mapping

Feedback Signal	Signal Code	Default Value										
Drive 1 Difference	XL18	0	*	1	*	*	*	*	*	*	x	x
Drive 1 Selected	XL19	0	1	0	*	*	*	*	*	*	x	x
Drive 2 Difference	XL38	0	*	*	*	1	*	*	*	*	x	x
Drive 2 Selected	XL39	0	*	*	1	0	*	*	*	*	x	x
Drive 3 Difference	XL58	0	*	*	*	*	*	1	*	*	x	x
Drive 3 Selected	XL59	0	*	*	*	*	1	0	*	*	x	x
Drive 4 Difference	XL78	0	*	*	*	*	*	*	*	1	x	x
Drive 4 Selected	XL79	0	*	*	*	*	*	*	1	0	x	x
Disturbance	XL68	0	0	0	0	0	0	0	0	0	1	1
Acknowledged	XL69	0	*	*	*	*	*	*	*	*	0	1
			UNIT 1 SELECTED	UNIT 1 DIFFERENCE	UNIT 2 SELECTED	UNIT 2 DIFFERENCE	UNIT 3 SELECTED	UNIT 3 DIFFERENCE	UNIT 4 SELECTED	UNIT 4 DIFFERENCE	DISTURBED	DISTURBED ACKN

6.13.3 VW2 (2 Selector)

6.13.3.1 Faceplates

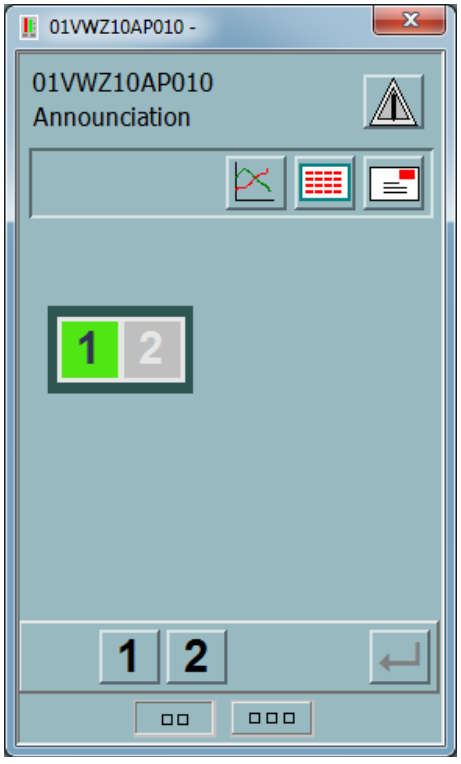


Figure 6-60: 2-Selector Faceplate

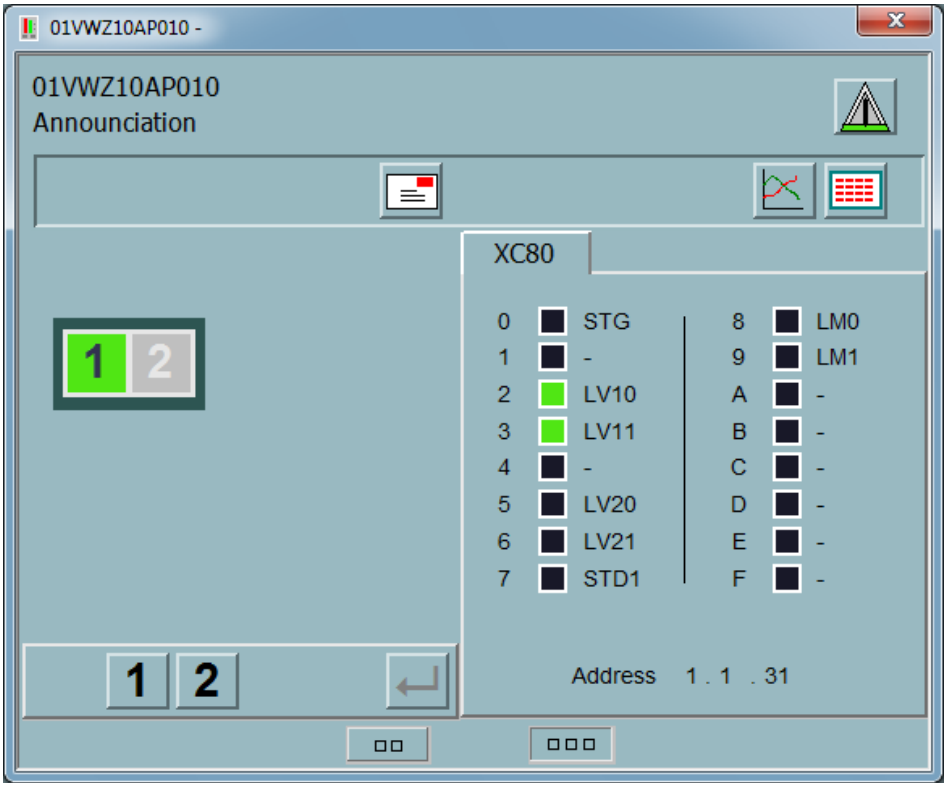
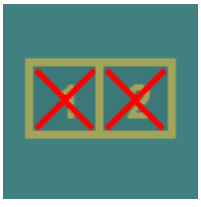


Figure 6-61: 2-Selector Extended Faceplate

6.13.3.2 Display Element Sel 2

Table 6-57: Display Element Sel 2

State	State Indication Normal	State Indication Disturbed
Unit 1 Selected		
Unit 1 Difference Unit 2 Selected		
Unit 2 Difference Unit 1 Selected		
Error		

6.13.4 VW3 (3 Selector)

6.13.4.1 Faceplates

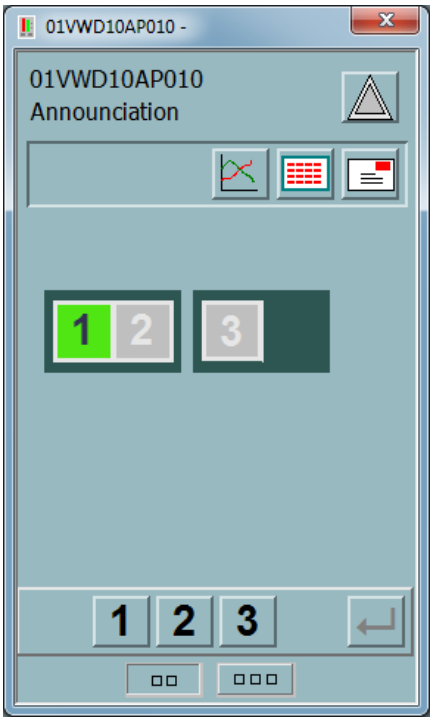


Figure 6-62: 3-Selector Faceplate

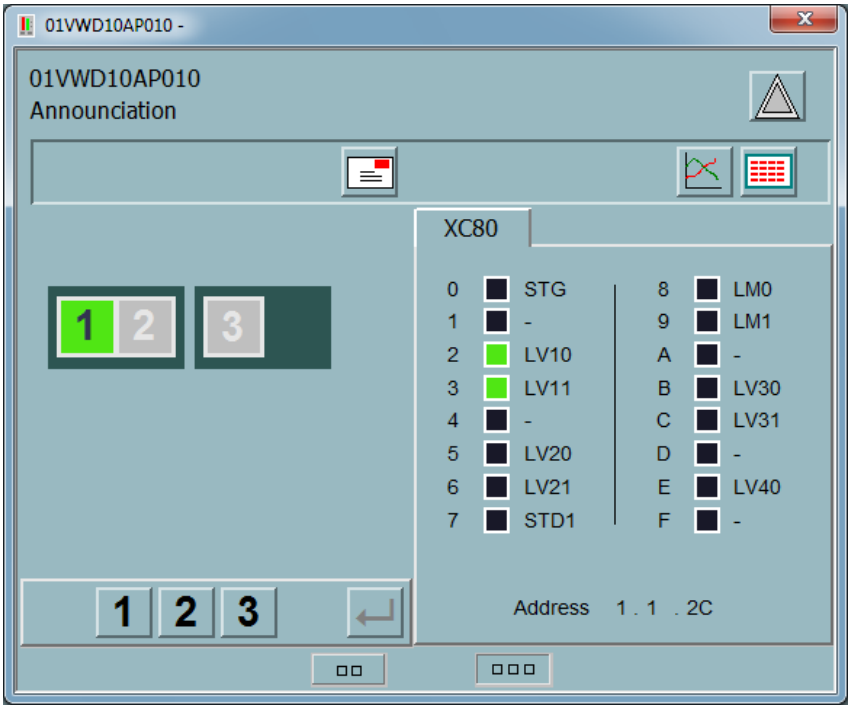
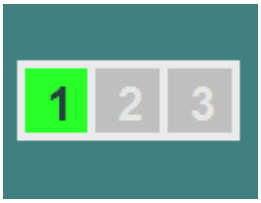
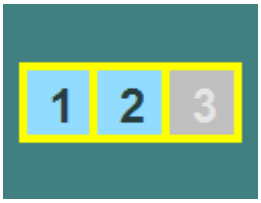
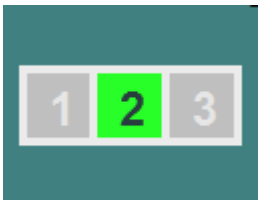
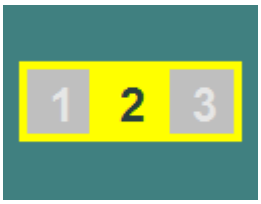
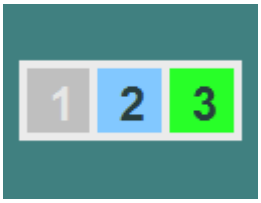
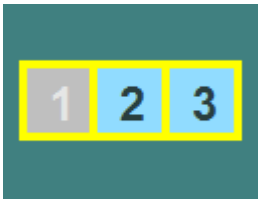
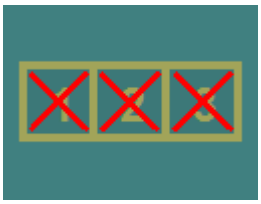


Figure 6-63: 3-Selector Extended Faceplate

6.13.4.2 Display Element Sel 2

Table 6-58: Display Element Sel 3

State	State Indication Normal	State Indication Disturbed
Unit 1 Selected		
Unit 1 Difference Unit 2 Selected		
Unit 2 Selected		
Unit 2 Difference Unit 3 Selected		
Presentation of other states follows the same principle…		
Error		

6.13.5 VW4 (4 Selector)

6.13.5.1 Faceplates

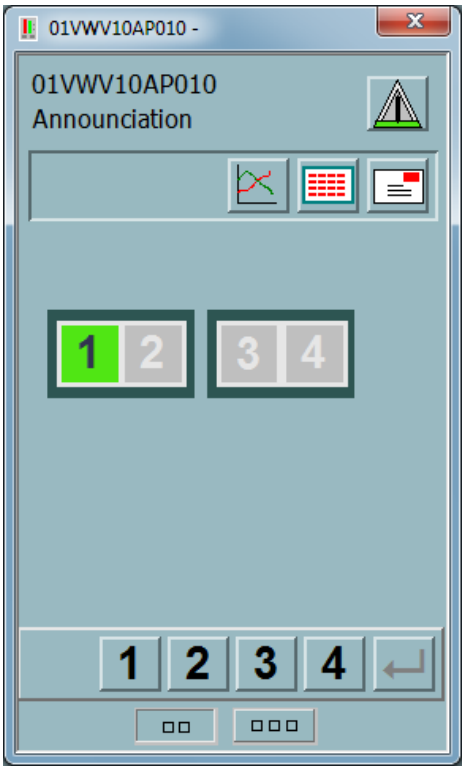


Figure 6-64: 4-Selector Faceplate

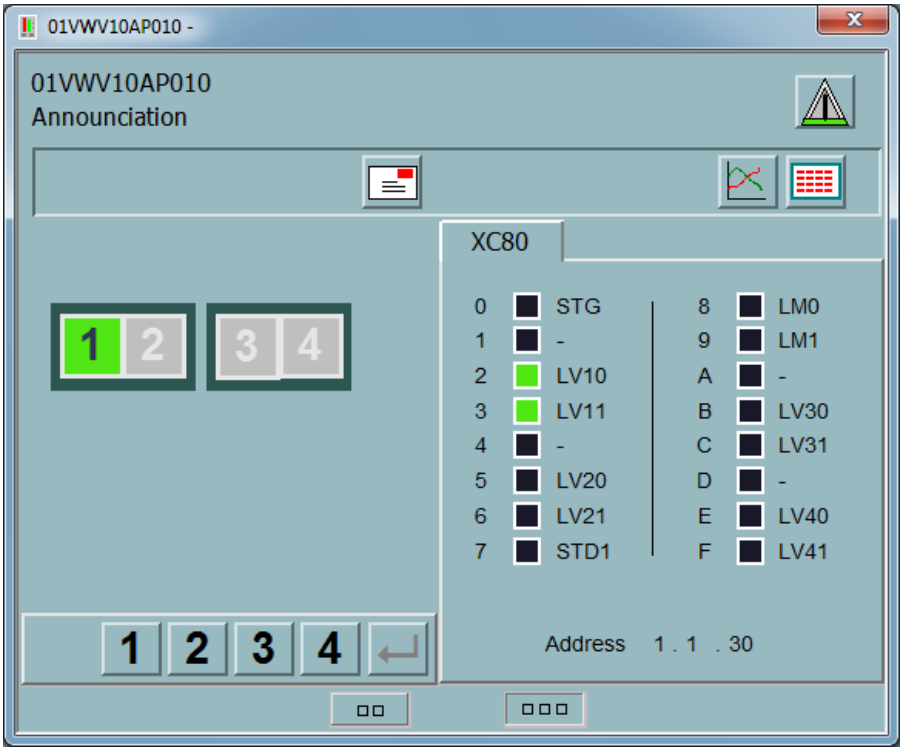
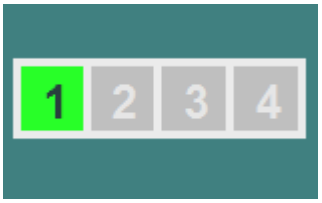
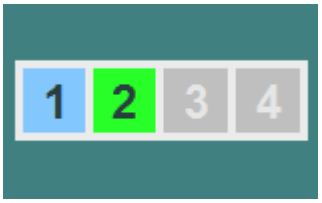
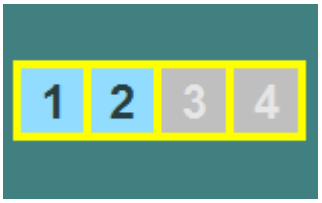
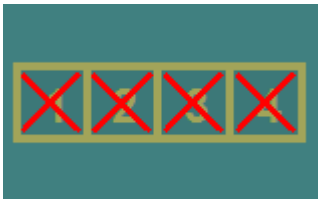


Figure 6-65: 4-Selector Extended Faceplate

6.13.5.2 Display Element Sel 4

Table 6-59: Display Element Sel 4

State	State Indication Normal	State Indication Disturbed
Unit 1 Selected		
Unit 1 Difference Unit 2 Selected		
Presentation of other states follows the same principle…		
Error		

6.14 Building P13 Specific Symbols from S+ Common Symbol Library

Refer to S+ Operations Common Symbol Library User Manual for building P13 specific symbols.

ABB Inc.
Power Generation
Wickliffe
OHIO, USA
E-Mail: powergeneration@us.abb.com
www.abb.com/controlsystems

ABB AG
Power Generation
Mannheim
GERMANY
E-Mail: powergeneration@de.abb.com
www.abb.com/controlsystems

ABB Pte. Ltd.
Power Generation
Singapore
SINGAPORE
E-Mail: powergeneration@sg.abb.com
www.abb.com/controlsystems

Docment Number 2VAA001153C